PREFACE

In 1993, the South Carolina Department of Health and Environmental Control (SCDHEC) published the first in a series of five watershed management documents. The third in that series, Watershed Water Quality Management Strategy: Catawba-Santee Basin communicated SCDHEC's innovative watershed approach, summarizing water programs and water quality in the basins. The approach continues to evolve and improve.

The watershed documents facilitate broader participation in the water quality management process. Through these publications, SCDHEC shares water quality information with internal and external partners, providing a common foundation for water quality improvement efforts at the local watershed or large-scale, often interstate, river basin level.

Water quality data from the Santee River Basin were collected and assessed at the start of this second five-year watershed management cycle. The assessment incorporates data from many more sites than were included in the first round. This updated atlas provides summary information on a watershed basis, as well as geographical presentations of all permitted watershed activities. A waterbody index and a facility index allow the reader to locate information on specific waters and facilities of interest.

A brief summary of the water quality assessments included in the body of this document is provided following the Table of Contents. This summary lists all waters within the Santee River Basin that fully support recreational and aquatic life uses, followed by those waters not supporting uses. In addition, the summaries list waters that have improved or degraded over the last 5 years since the original strategy was written. More comprehensive information can be found in the individual watershed sections. The information provided is accurate to the best of our ability at the time of writing and will be updated in five years.

As SCDHEC continues basinwide and statewide water quality protection and improvement efforts, we are counting on the support and assistance of all stakeholders in the Santee River Basin to participate in bringing about water quality improvements. We look forward to working with you.

If you have questions or comments regarding this document, or if you are seeking further information on the water quality in the Santee River Basin, please contact :

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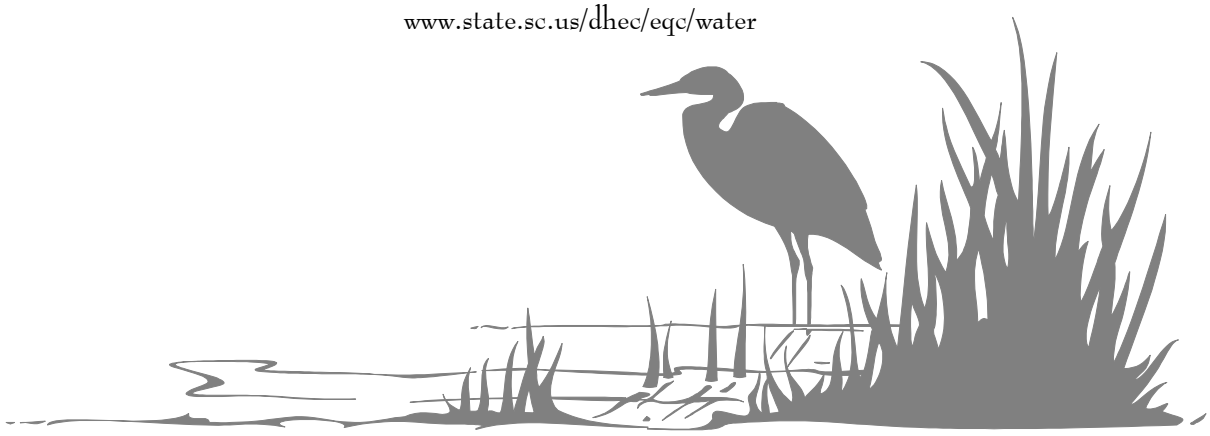

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Santee River Basin - Sites that Improved from 1994 to 1998

REC= Recreational; AL=Aquatic Life; F=Fully Supported Standards; P=Partially Supported Standards; N=Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1994	1998	1994	1998	1994	1998
03050111-010	SC-009	Spring Grove Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
	SC-011	Big Poplar Creek	AL	N	F	Dissolved Oxygen			
03050111-020	CW-242	Halfway Swamp Creek Trib.	REC	N	P	Fecal Coliform	Fecal Coliform		
03050111-030	CW-243	Big Branch	REC	N	P	Fecal Coliform	Fecal Coliform		
03050112-010	ST-016	Santee River	AL	P	F	Dissolved Oxygen		Decreasing pH	Increasing Turbidity
03050112-030	ST-001	Santee River	REC	P	F	Fecal Coliform		Increasing Fecal Coliform	
03050112-060	ST-005	North Santee River	AL	P	F	Dissolved Oxygen		Decreasing pH	
03050201-010	CSTL-078 SC-025	Diversion Canal	AL	P	F	Copper, Zinc		Decreasing pH	Decreasing Dissolved Oxygen, pH
	SC-043	Lake Moultrie Trib.	AL	P	F	Dissolved Oxygen			
	SC-034	Duck Pond Creek	AL	N	F	Dissolved Oxygen, pH			
03050201-050	MD-248	Cooper River	REC	N	F	Fecal Coliform			Increasing pH
	MD-045	Cooper River	REC	P	F	Fecal Coliform		Decreasing Dissolved Oxygen, pH	Decreasing Dissolved Oxygen, pH; Increasing Turbidity
	MD-046	Cooper River	REC	P	F	Fecal Coliform		Decreasing Dissolved Oxygen; Increasing Turbidity	Decreasing Dissolved Oxygen, pH; Increasing Turbidity
	MD-249	Filbin Creek	AL	P	F	Dissolved Oxygen			Increasing pH

Santee River Basin - Sites that Improved from 1994 to 1998

REC= Recreational; AL=Aquatic Life; F=Fully Supported Standards; P=Partially Supported Standards; N=Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1994	1998	1994	1998	1994	1998
03050201-060	MD-240	Foster Creek	REC	N	P	Fecal Coliform	Fecal Coliform	Increasing pH	Increasing Total Phosphorus, pH
03050201-070	MD-039	Goose Creek	AL	P	F	Zinc		Decreasing pH	Increasing Turbidity
	ST-032	Goose Creek Reservoir	AL	N	P	Dissolved Oxygen	Dissolved Oxygen		Increasing Total Phosphorus, Total Nitrogen, Turbidity, pH
03050201-080	MD-115	Wando River	AL	N	P	Copper, Zinc, Cadmium	Dissolved Oxygen	Decreasing Dissolved Oxygen, pH	Decreasing Dissolved Oxygen; Increasing Turbidity
03050202-020	CSTL-102	Ashley River	REC	N	P	Fecal Coliform	Fecal Coliform	Increasing BOD, Turbidity	Decreasing Dissolved Oxygen
03050202-040	MD-135	Ashley River	AL	N	F	Dissolved Oxygen		Decreasing Dissolved Oxygen; Increasing Turbidity	Increasing Turbidity
			REC	P	F	Fecal Coliform			
	MD-052	Ashley River	AL	N	P	Dissolved Oxygen	Dissolved Oxygen	Decreasing Dissolved Oxygen; Increasing Turbidity	Decreasing Dissolved Oxygen, pH; Increasing Turbidity
			REC	P	F	Fecal Coliform			
03050202-050	MD-025	Elliott Cut	REC	N	P	Fecal Coliform	Fecal Coliform	Decreasing pH	Decreasing Dissolved Oxygen, pH
03050202-060	MD-250	Awendaw Creek	REC	N	P	Fecal Coliform	Fecal Coliform		
03050202-070	MD-034	Ashley River	REC	P	F	Fecal Coliform		Decreasing Dissolved Oxygen; Increasing Turbidity	Decreasing pH

Santee River Basin - Sites that Improved from 1994 to 1998

REC= Recreational; AL=Aquatic Life; F=Fully Supported Standards; P=Partially Supported Standards; N=Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1994	1998	1994	1998	1994	1998
	MD-026	Stono River	AL	N	P	Metals, Dissolved Oxygen	Dissolved Oxygen	Decreasing Dissolved Oxygen, pH	Decreasing Dissolved Oxygen, pH; Increasing Turbidity

Santee River Basin - Sites that Degraded from 1994 to 1998

REC= Recreational; AL=Aquatic Life; F=Fully Supported Standards; P=Partially Supported Standards; N=Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1994	1998	1994	1998	1994	1998
03050111-010	ST-025	Lake Marion	AL	F	N		Copper	Decreasing pH	Decreasing pH, Increasing Fecal Coliform
	SC-058	Stream from Offsite, Safety Kleen Pinewood	AL	F	N		pH		
	SC-006	Warley Creek	REC	F	P		Fecal Coliform		
03050111-020	SC-007	Halfway Swamp Creek	REC	P	N	Fecal Coliform	Fecal Coliform		
03050111-040	ST-018 SC-018	Taw Caw Creek	AL	F	N		Dissolved Oxygen		Increasing Total Phosphorous
	SC-017	Taw Caw Creek Embayment	AL	F	N		Copper		
03050111-050	SC-020	Potato Creek	REC	F	P		Fecal Coliform		
	SC-023	Wyboo Creek	AL	F	N		Copper, Lead		
	SC-035	Wyboo Creek	AL	F	N		Copper, Lead		
03050201-010	SC-033	Tail Race Canal	AL	F	P		pH	Decreasing Dissolved Oxygen, pH	Decreasing Dissolved Oxygen
03050201-020	CSTL-113	Wadboo Swamp	REC	P	N	Fecal Coliform	Fecal Coliform		
03050201-030	CSTL-085	West Branch Cooper River	REC	F	P		Fecal Coliform	Decreasing pH	
03050201-070	MD-113	Goose Creek Reservoir	REC	F	P		Fecal Coliform	Decreasing Dissolved Oxygen, pH	Decreasing Dissolved Oxygen, pH

Santee River Basin - Sites that Degraded from 1994 to 1998

REC= Recreational; AL=Aquatic Life; F=Fully Supported Standards; P=Partially Supported Standards; N=Nonsupported Standards

Watershed	Sta.#	Waterbody Name	Use	Status		Cause		Trends	
				1994	1998	1994	1998	1994	1998
03050202-010	CSTL-078	Cypress Swamp	REC	F	N		Fecal Coliform		
03050202-040	MD-246	Church Creek	AL	F	P		Dissolved Oxygen		Increasing pH
03050202-050	MD-202	Stono River	AL	F	P		Dissolved Oxygen	Decreasing Dissolved Oxygen, pH; Increasing Turbidity	Decreasing Dissolved Oxygen; Increasing Total Phosphorus, Turbidity, pH
			REC	F	P		Fecal Coliform		
	MD-025	Elliott Cut	AL	F	N		Dissolved Oxygen	Decreasing pH	Decreasing Dissolved Oxygen, pH
03050202-070	MD-071	Shem Creek	REC	P	N	Fecal Coliform	Fecal Coliform	Increasing Turbidity	Decreasing Dissolved Oxygen; Increasing Fecal Coliform
	MD-206	Stono River	AL	F	N		Dissolved Oxygen	Decreasing Dissolved Oxygen	Increasing Turbidity

Fully Supported Sites in the Santee River Basin

* = Station not evaluated for Recreational Support; ** = Not a Predictor of Future Impairment

Watershed	Sta #	Waterbody Name	Improving Trends	Other Trends**
03050111-010	SC-004	Santee River		
	SC-008	Santee River		
	SC-005	Lake Marion		
	SC-038	Lake Marion		
	SC-039	Lake Marion		
	SC-010	Lake Marion		
	SC-044	Lake Marion		
	SC-012	Lake Marion		
	SC-015	Lake Marion		
	SC-042	Lake Marion		
	SC-040	Lake Marion		
	SC-041	Lake Marion		
	SC-016	Lake Marion		
	SC-036	Lake Marion		
	SC-021	Lake Marion		
	SC-022	Lake Marion		
	SC-057	Drainage from Safety Kleen Sed. Pond A		
	SC-011	Big Poplar Creek		
	SC-045	Santee Nat l Golf Course Stream		

Fully Supported Sites in the Santee River Basin

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Watershed	Sta #	Waterbody Name	Improving Trends	Other Trends**
	SC-014	Chapel Branch		
03050111-050	SC-019	Potato Creek		
03050112-010	ST-016	Santee River	Decreasing BOD, Total Nitrogen	Increasing Turbidity
	SC-024	Santee River		
03050112-020	ST-016	Rediversion Canal		Decreasing Dissolved Oxygen, Increasing Turbidity, pH
	SC-037	Rediversion Canal		
03050112-030	ST-001	Santee River	Decreasing BOD, Total Nitrogen	Decreasing Dissolved Oxygen
03050112-050	CSTL-112	Wambaw Creek		
03050112-060	ST-005	North Santee River	Decreasing BOD, Turbidity	
	ST-006	South Santee River	Decreasing BOD, Total Nitrogen, Turbidity	Decreasing Dissolved Oxygen
03050201-010	CSTL-079 SC-025	Diversion Canal	Decreasing BOD, Total Nitrogen, and Fecal Coliform	Decreasing Dissolved Oxygen, pH
	SC-027	Lake Moultrie		
	SC-028	Lake Moultrie		
	SC-029	Lake Moultrie		
	SC-030	Lake Moultrie		
	SC-031	Lake Moultrie		
	SC-046	Lake Moultrie		
	SC-032	Lake Moultrie		
	CSTL-062	Tail Race Canal	Decreasing BOD, Total Phosphorus, Total Nitrogen, and Fecal Coliform	Decreasing Dissolved Oxygen

Fully Supported Sites in the Santee River Basin

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Watershed	Sta #	Waterbody Name	Improving Trends	Other Trends**
03050201-050	MD-043	Cooper River	Decreasing BOD, Total Phosphorus, Total Nitrogen	Decreasing Dissolved Oxygen; Increasing Turbidity
	MD-044	Cooper River	Decreasing BOD, Total Nitrogen	Decreasing Dissolved Oxygen, pH; Increasing Turbidity
03050201-050	MD-248	Cooper River	Decreasing BOD, Total Phosphorus, Total Nitrogen, Turbidity, and Fecal Coliform	Increasing pH
	MD-045	Cooper River	Decreasing BOD, Total Nitrogen, Fecal Coliform	Decreasing Dissolved Oxygen, pH; Increasing Turbidity
	MD-047	Cooper River	Decreasing Total Nitrogen	Decreasing Dissolved Oxygen, pH
	MD-046	Cooper River	Decreasing BOD, Total Nitrogen	Decreasing Dissolved Oxygen, pH; Increasing Turbidity
03050201-060	MD-217	Durham Creek	Decreasing BOD	
	MD-152	Back River	Decreasing BOD, Total Nitrogen	Decreasing Dissolved Oxygen; Increasing Turbidity
03050201-080	MD-198	Wando River	Decreasing Total Nitrogen	Decreasing Dissolved Oxygen, pH; Increasing Turbidity
03050202-040	MD-135	Ashley River		Increasing Turbidity
03050202-050	MD-020	Wappoo Creek		Decreasing Dissolved Oxygen, pH; Increasing Fecal Coliform
03050202-060	MD-069	AIWW		Decreasing Dissolved Oxygen, pH
03050202-070	MD-247	Charleston Harbor	Decreasing Total Nitrogen	
	MD-165	Charleston Harbor	Decreasing Total Nitrogen	Increasing Turbidity, Fecal Coliform
	MD-048	Charleston Harbor		Increasing Total Suspended Solids
	MD-034	Ashley River	Decreasing Total Nitrogen	Decreasing pH
	MD-207	Kiawah River	Decreasing BOD	Increasing Turbidity

Fully Supported Sites in the Santee River Basin

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Watershed	Sta #	Waterbody Name	Improving Trends	Other Trends**
	MD-208	Stono River		Increasing Turbidity

Impaired Sites in the Santee River Basin

REC=Recreational; AL=Aquatic Life; P=Partially Supported Standards; N=Nonsupported Standards; *=Eutrophication Assessment; **=Not a Predictor of Future Impairment

Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050111-010	ST-025	Lake Marion	AL	N	Copper		Decreasing pH; Increasing Fecal Coliform
	SC-056	Drainage from Safety Kleen Sed. Pond B	AL	N	pH		
	SC-058	Stream from Offsite, Safety Kleen Pinewood	AL	N	pH		
	SC-009	Spring Grove Creek	REC	P	Fecal Coliform		
	SC-006	Warley Creek	REC	P	Fecal Coliform		
	ST-024	Potato Creek Embayment	AL	N	Zinc		Decreasing Dissolved Oxygen; Increasing Turbidity
03050111-020	C-063	Halfway Swamp Creek	REC	N	Fecal Coliform		Increasing pH
	SC-007	Halfway Swamp Creek	REC	N	Fecal Coliform		
	CW-241	Halfway Swamp Creek	REC	N	Fecal Coliform		
	CW-242	Halfway Swamp Creek Trib.	REC	P	Fecal Coliform		
	C-058	Lake Inspiration	AL	P	Dissolved Oxygen, pH	Decreasing Dissolved Oxygen, pH	
			REC	P	Fecal Coliform		
03050111-030	CW-244 SC-013	Jacks Creek	REC	P	Fecal Coliform		
	CW-243	Big Branch	REC	P	Fecal Coliform		
03050111-040	ST-018 SC-018	Tawcaw Creek	AL	N	Dissolved Oxygen		Increasing Total Phosphorus
			REC	N	Fecal Coliform		

Impaired Sites in the Santee River Basin

REC=Recreational; AL=Aquatic Life; P=Partially Supported Standards; N=Nonsupported Standards; *=Eutrophication Assessment; **=Not a Predictor of Future Impairment

Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
	SC-017	Tawcaw Creek Arm of Lake Marion	AL	*	Nutrients		
03050111-050	SC-020	Potato Creek	REC	P	Fecal Coliform		
	SC-023	Wyboo Creek	AL	*	Nutrients		
03050201-010	SC-033	Tail Race Canal	AL	P	pH		
	SC-043	Lake Moultrie Trib.	REC	P	Fecal Coliform		
	SC-026	Lake Moultrie Trib.	REC	N	Fecal Coliform		
	SC-034	Duck Pond Creek	REC	P	Fecal Coliform		
03050201-020	CSTL-113	Wadboo Creek	REC	N	Fecal Coliform		
	ST-007	Walker Swamp	REC	N	Fecal Coliform		Increasing Turbidity
03050201-030	CSTL-085	West Branch Cooper River	REC	P	Fecal Coliform		
03050201-050	MD-243	Shipyard Creek	AL	N	Shellfish Ban; Sediment Contamination		
	MD-249	Filbin Creek	REC	N	Fecal Coliform		Increasing pH
03050201-060	MD-152	Back River	AL	N	Copper		Decreasing Dissolved Oxygen; Increasing Turbidity
	MD-240	Foster Creek	AL	N	Dissolved Oxygen; Copper		Increasing Total Phosphorus, pH
			REC	P	Fecal Coliform		

Impaired Sites in the Santee River Basin

REC=Recreational; AL=Aquatic Life; P=Partially Supported Standards; N=Nonsupported Standards; *=Eutrophication Assessment; **=Not a Predictor of Future Impairment

Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050201-070	MD-114	Goose Creek	AL	N	Dissolved Oxygen		
			REC	P	Fecal Coliform		
	MD-039	Goose Creek	REC	N	Fecal Coliform		Increasing Turbidity
03050201-070	MD-113	Goose Creek Reservoir	AL	N	Dissolved Oxygen	Decreasing Dissolved Oxygen	Decreasing pH
			REC	P	Fecal Coliform		
	ST-032	Goose Creek Reservoir	AL	P	Dissolved Oxygen		Increasing pH, Total Phosphorus, Total Nitrogen, Turbidity
03050201-080	MD-115	Wando River	AL	P	Dissolved Oxygen	Decreasing Dissolved Oxygen	Increasing Turbidity
03050202-010	CSTL-063	Wassamassaw Swamp	REC	P	Fecal Coliform	Increasing Fecal Coliform	
	CSTL-078	Cypress Swamp	REC	N	Fecal Coliform		
03050202-020	CSTL-102	Ashley River	AL	N	Dissolved Oxygen	Decreasing Dissolved Oxygen	
			REC	P	Fecal Coliform		
03050202-030	CSTL-043	Sawmill Branch	AL	N	Dissolved Oxygen		Decreasing pH
			REC	N	Fecal Coliform		
	CSTL-013	Dorchester Creek	AL	P	Dissolved Oxygen, pH		
			REC	N	Fecal Coliform		
	CSTL-099	Eagle Creek	REC	N	Fecal Coliform		

Impaired Sites in the Santee River Basin

REC=Recreational; AL=Aquatic Life; P=Partially Supported Standards; N=Nonsupported Standards; *=Eutrophication Assessment; **=Not a Predictor of Future Impairment

Watershed	Sta.#	Waterbody Name	Use	Status	Cause	Undesirable Trends	Other Trends**
03050202-040	MD-049	Ashley River	AL	N	Dissolved Oxygen, Copper	Increasing Fecal Coliform	Increasing Turbidity
			REC	N	Fecal Coliform		
	MD-052	Ashley River	AL	P	Dissolved Oxygen	Decreasing Dissolved Oxygen	Decreasing pH; Increasing Turbidity
	MD-246	Church Creek	AL	P	Dissolved Oxygen		Increasing pH
			REC	N	Fecal Coliform		
03050202-050	MD-121	Log Bridge Creek	REC	N	Fecal Coliform		Increasing pH, Turbidity
	MD-202	Stono River	AL	P	Dissolved Oxygen	Decreasing Dissolved Oxygen	Increasing pH, Turbidity, Total Phosphorus
			REC	P	Fecal Coliform		
	MD-025	Elliot Cut	AL	N	Dissolved Oxygen	Decreasing Dissolved Oxygen	Decreasing pH
			REC	P	Fecal Coliform		
03050202-060	MD-250	Awendaw Creek	REC	P	Fecal Coliform		
	MD-203	Jeremy Creek	REC	P	Fecal Coliform		Increasing pH, Total Nitrogen
03050202-070	MD-071	Shem Creek	AL	P	Dissolved Oxygen	Decreasing Dissolved Oxygen; Increasing Fecal Coliform	
			REC	N	Fecal Coliform		
	MD-026	Stono River	AL	P	Dissolved Oxygen	Decreasing Dissolved Oxygen	Increasing Turbidity; Decreasing pH
	MD-206	Stono River	AL	N	Dissolved Oxygen		Increasing Turbidity

Introduction

The South Carolina Department of Health and Environmental Control (SCDHEC or the Department) initiated its first watershed planning activities as a result of a U.S. Environmental Protection Agency (USEPA) grant in June of 1972. These activities were soon extended by §303(e), "Federal Water Pollution Control Act Amendments of 1972", U.S. Public Law 92-500. In 1975, the SCDHEC published basin planning reports for the four major basins in South Carolina. The next major planning activity resulted from §208 of the Federal Water Pollution Control Act, which required states to prepare planning documents on an areawide basis. Areawide plans were completed in the late 1970's for the five designated areas of the State and for the nondesignated remainder of the State. To date, these plans or their updated versions have served as information sources and guides for water quality management.

The Bureau of Water emphasizes watershed planning to better coordinate river basin planning and water quality management. Watershed-based management allows the Department to address Congressional and Legislative mandates in a coordinated manner and to better utilize current resources. The watershed approach also improves communication between the Department, the regulated community, and the public on existing and future water quality issues.

Purpose of the Watershed Water Quality Assessment

A watershed is a geographic area into which the surrounding waters, sediments, and dissolved materials drain, and whose boundaries extend along surrounding topographic ridges. Watershed-based water quality management recognizes the interdependence of water quality related activities associated with a drainage basin including: monitoring, problem identification and prioritization, water quality modeling, planning, permitting, and other activities. The Bureau of Water's Watershed Water Quality Management Program integrates these activities by watershed, resulting in watershed management plans that appropriately focus water quality protection efforts. While an important aspect of the program is water quality problem identification and solution, the emphasis is on problem prevention.

The Department has divided the State into five regions (areas consisting of one or more river basins), along hydrologic lines, which contain approximately the same number of NPDES permitted dischargers. A Watershed Water Quality Assessment (WWQA) will be created for each river basin within the five regions and will be updated on a five-year rotational basis. This will allow for effective allocation and coordination of water quality activities and efficient use of available resources. The Santee River Basin is subdivided into 26 watersheds or hydrologic units. The hydrologic units used are the USDA Natural Resource Conservation Service 11-digit codes for South Carolina. All water quality related evaluations will be made at the watershed level. The stream names used are derived from USGS topographic maps. USEPA Reach data (RF3) were used for the digital hydrography and stream length estimates. Based on the blue line streams of the USGS topo maps, it is likely that portions of the stream network in terms of perennial, intermittent, and ephemeral streams are not represented.

The watershed-based assessments fulfill a number of USEPA reporting requirements including various activities under §303(d), §305(b), §314, and §319 of the Clean Water Act (CWA). Section 303(d) requires a listing of waters located within a watershed which do not meet applicable water quality standards. Section 305(b) requires that the State biennially submit a report that includes a water quality description and analysis of all navigable waters to estimate environmental impacts. Section 314 requires that the State submit a biennial report that identifies, classifies, describes, and assesses the status and trends in water quality of publicly owned lakes. The watershed plan is also a logical evaluation, prioritization, and implementation tool for nonpoint source (§319) requirements. Nonpoint source best management practices (BMPs) can be selected by identifying water quality impairments and necessary controls, while considering all the activities occurring in the drainage basin.

The assessment also allows for more efficient issuance of National Pollutant Discharge Elimination System (NPDES) and State wastewater discharge permits. Proposed permit issuances within a watershed may be consolidated and presented to the public in groups, rather than one at a time, allowing the Department to realize a resource savings, and the public to realize an information advantage.

The Watershed Water Quality Assessment (WWQA) is a geographically-based document that describes, at the watershed level, all water quality related activities that may potentially have a negative impact on water quality. The Watershed Implementation Staff investigates the impaired streams mentioned in the WWQA to determine, where possible, the source of the impairment and recommends solutions to correct the problems. As part of this effort, the watershed staff is forging partnerships with various federal and state agencies, local governments, and community groups. In particular, the Department's Watershed Program and the Natural Resource Conservation Service (NRCS) district offices are working together to address some of the nonpoint source (NPS) concerns in the basin. By combining NRCS's local knowledge of land use and the Department's knowledge of water quality, we are able to build upon NRCS's close relationships with landowners and determine where NPS projects are needed. These projects may include educational campaigns or special water quality studies.

Factors Assessed in Watershed Evaluations

Water Quality

The Water Program comprises activities within SCDHEC's Bureau of Water and Bureau of Environmental Services. The Program's objectives are to ensure that the water in South Carolina is safe for drinking and recreation, and that it is suitable to support and maintain aquatic flora and fauna. Functions include planning, permitting, compliance assurance, enforcement, and monitoring. This section provides an overview of water quality evaluation and protection activities.

Monitoring

In an effort to evaluate the State's water quality, the Department operates and collects data from a permanent Statewide network of primary and secondary ambient monitoring stations and flexible, rotating watershed monitoring stations. The ambient monitoring network is directed toward determining long-term water quality trends, assessing attainment of water quality standards, identifying locations in need of additional attention, and providing background data for planning and evaluating stream classifications and standards.

Ambient monitoring data are also used in the process of formulating permit limits for wastewater discharges with the goal of maintaining State and Federal water quality standards and criteria in the receiving streams in accordance with the goals of the Clean Water Act. These standards and criteria define the instream chemical concentrations that provide for protection and reproduction of aquatic flora and fauna, help determine support of the classified uses of each waterbody, and serve as instream limits for the regulation of wastewater discharges or other activities. In addition, these data are used in the preparation of the biennial §305(b) report to Congress, which summarizes the State's water quality with respect to attainment of classified uses by comparing the ambient monitoring network data to the State Water Quality Standards.

SCDHEC s ambient water quality monitoring network comprises three station types: primary (P), secondary (S), and watershed (W) stations. Primary stations are sampled on a monthly basis year round, and are located in high water-use areas or upstream of high water-use areas. The static primary station network is operated statewide, and receives the most extensive parameter coverage, thus making it best suited for detecting long term trends.

Secondary stations are sampled monthly from May through October, a period critical to aquatic life, and is characterized by higher water temperatures and lower flows. Secondary stations are located in areas where specific monitoring is warranted due to point source discharges, or in areas with a history of water quality problems. Secondary station parameter coverage is less extensive and more flexible than primary or watershed station coverages. The number and locations of secondary stations have greater annual variability than do those in the primary station network, and during a basin's target year may have parameter coverage and sampling frequency duplicating that of primary or watershed stations.

Watershed stations are sampled on a monthly basis, year round, during a basin's target year. Additional watershed stations may be sampled monthly from May through October to augment the secondary station network. Watershed stations are located to provide more complete and representative coverage within the larger drainage basin, and to identify additional monitoring needs. Watershed stations have the same parameter coverage as primary stations.

Many pollutants may be components of point source discharges, but may be discharged in a discontinuous manner, or at such low concentrations that water column sampling for them is impractical. Some pollutants are also common in nonpoint source runoff, reaching waterways only after a heavy rainfall; therefore, in these situations, the best media for the detection of these chemicals are sediment and fish tissue where they may accumulate over time. Their impact may also affect the macroinvertebrate community.

Ambient trend monitoring is conducted to collect data to indicate general biological conditions of State waters which may be subject to a variety of point and nonpoint source impacts. In 1991, the Department began incorporating ambient macroinvertebrate data into the development of Watershed Water Quality Assessments. Ambient sampling is also used to establish regional reference or "least impacted" sites from which to make comparisons in future monitoring. Additionally, special macroinvertebrate studies, in which stream specific comparisons among stations located upstream and downstream from a known discharge or nonpoint source area, are used to assess impact.

Qualitative sampling of macroinvertebrate communities are the primary bioassessment techniques used in ambient trend monitoring. A habitat assessment of general stream habitat availability and a substrate characterization is conducted at each site. Annual ambient monitoring is conducted during low flow "worst case" conditions in July - September. Some coastal plain streams that have no flow conditions in the summer months may be sampled in the winter (January-March). This technique may also be used in special studies for the purpose of determining if, and to what extent, a wastewater discharge or nonpoint source runoff is impacting the receiving stream. A minimum of two sample locations, one upstream and one downstream from a discharge or runoff area, is collected. At least one downstream recovery station is also established when appropriate. Sampling methodology follows procedures described in Standard Operating Procedures, Biological Monitoring.

Aquatic sediments represent a historical record of chronic conditions existing in the water column. Pollutants bind to particulate organic matter in the water column and settle to the bottom where they become part of the sediment "record". Accumulated sediments not only reflect the impact of point source discharges, but also incorporate nonpoint source pollution washed into the stream during rain events. As a result, contaminant concentrations originating from irregular and highly variable sources are recorded in the sediment. The sediment concentrations at a particular location do not vary as rapidly with time as do the water column concentrations. Thus, the sediment record may be read at a later time, unrelated to the actual release time. Lakes act as settling basins for materials entering the lake system directly from a discharge or indirectly from the land surface washed into streams. Therefore, it is not unusual for lake sediment concentrations to be higher than sediment concentrations found in streams. This is especially true for chromium, copper, and zinc.

The ambient monitoring program, has the capability of sampling a wide range of media and analyzing them for the presence or effects of contaminants. Ambient monitoring data from 45 primary (P) stations, 14 secondary (S) stations, and 8 watershed (W) stations were reviewed for the Santee River Basin, along with 46 Santee Cooper Public Service Authority stations to augment information on the Santee Cooper Lakes.

Classified Waters, Standards, and Natural Conditions

The waters of the State have been classified in regulation based on the desired uses of each waterbody. State standards for various parameters have been established to protect all uses within each classification. The water-use classifications that apply to this basin are as follows.

Class ORW, or "outstanding resource waters", are freshwaters or saltwaters which constitute an outstanding recreational or ecological resource, or those freshwaters suitable as a source for drinking water supply purposes, with treatment levels specified by the Department.

Class A were freshwaters which were suitable for primary contact recreation. This class was also suitable for uses listed as Class B. As of April, 1992, Class A and Class B waters were reclassified as Class FW which protects for primary contact recreation.

Class B were freshwaters which were suitable for secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with the requirements of the Department. These waters were suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class was also suitable for industrial and agricultural uses. The main difference between the Class A and B freshwater was the fecal coliform standard. Class A waters were not to exceed a geometric mean of 200/100ml, based on 5 consecutive samples during any 30 day period; nor were more than 10% of the total samples during any 30 day period to exceed 400/100ml. Class B waters were not to exceed a geometric mean of 1000/100ml, based on 5 consecutive samples during any 30 day period; nor were more than 20% of the total samples during any 30 day period to exceed 2000/100ml. As of April, 1992, Class A and Class B waters were reclassified as Class FW, which protects for primary contact recreation.

Class FW, or "freshwaters", are freshwaters which are suitable for primary and secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with the requirements of the Department. These waters are suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class is also suitable for industrial and agricultural uses.

Class SFH, or "shellfish harvesting" waters, are tidal saltwaters protected for shellfish harvesting, and are suitable also for uses listed in Classes SA and SB.

Class SA comprises "tidal saltwaters" suitable for primary and secondary contact recreation, crabbing and fishing. These waters are not protected for harvesting of clams, mussels, or oysters for market purposes or human consumption. The waters are suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.

Class SB are "tidal saltwaters" suitable for the same uses listed in SA. The difference between the Class SA and SB saltwater concerns the DO limitations. Class SA waters must maintain daily DO averages not less than 5.0 mg/l, with a minimum of 4.0 mg/l, and Class SB waters maintain DO levels not less than 4.0 mg/l.

Site specific numeric standards (*) for surface waters may be established by the Department to replace the numeric standards found in Regulation 61-68 or to add new standards not contained in R.61-68. Establishment of such standards shall be subject to public participation and administrative procedures for adopting regulations. In addition, such site specific numeric standards shall not apply to tributary or downstream waters unless specifically described in the water classification listing in R.61-69.

The standards are used as instream water quality goals to maintain and improve water quality and also serve as the foundation of the Bureau of Water's program. They are used to determine permit limits for treated wastewater dischargers and any other activities that may impact water quality. Using mathematical Wasteload Allocation Models, the impact of a wastewater discharge on a receiving stream, where flow is unregulated by dams, is predicted using 7Q10 streamflows. These predictions are then used to set limits for different pollutants on the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The NPDES permit limits are set so that, as long as a permittee (wastewater discharger) meets the established permit limits, the discharge should not cause a standards violation in the receiving stream. All discharges to the waters of the State are required to have an NPDES permit and must abide by those limits, under penalty of law.

Classifications are based on desired uses, not on natural or existing water quality, and are a legal means to obtain the necessary treatment of discharged wastewater to protect designated uses. Actual water quality may not have a bearing on a waterbody's classification. A waterbody may be reclassified if desired or existing public uses justify the reclassification and the water quality necessary to protect these uses is attainable. A classification change is an amendment to a State regulation and requires public participation, SCDHEC Board approval, and General Assembly approval.

Natural conditions may prevent a waterbody from meeting the water quality goals as set forth in the standards. The fact a waterbody does not meet the specified numeric standards for a particular classification does not mean the waterbody is polluted or of poor quality. Certain types of waterbodies (ie. swamps, lakes, tidal creeks) may naturally have water quality lower than the numeric standards. A waterbody can have water quality conditions below standards due to natural causes and still meet its use classification. A site specific numeric standard may be established by the Department after being subjected to public participation and administrative procedures for adopting regulations. Site specific numeric standards apply only to the stream segment described in the water classification listing, not to tributaries or downstream unspecified waters.

Lake Trophic Status

Trophic status is a characterization of a lake's biological productivity based on the availability of plant nutrients, especially phosphorus. Commonly accepted systems for describing trophic status recognize a range of conditions, with "oligotrophic" indicating the least biologically productive lakes and

"eutrophic" indicating significantly higher levels of productivity. A lake's trophic condition may shift over time. The trophic condition of South Carolina lakes is monitored through SCDHEC s network of routine sampling stations and through periodic sampling of additional lakes. All lakes of at least 40 acres in area that offer public access are monitored.

Most commonly, large external inputs of nutrients from point and/or nonpoint sources lead to advanced eutrophication. Advanced eutrophication is indicated by excessive algal growth, rapid sedimentation, and seasonal or daily dissolved oxygen deficiencies. Advanced eutrophication can cause undesirable shifts in the composition of aquatic life, or even fish kills. Restoring a lake to a more desirable trophic condition requires reductions in nutrient inputs, usually phosphorus.

Shellfish Harvesting Waters

South Carolina's coastal area consists of 570,304 acres of surface water with an assigned classification designated for the harvest of molluscan shellfish. This coastal area is divided into 24 shellfish management areas with a total of 499 active monitoring stations. The purpose of this monitoring network is to provide data which accurately reflects the sanitary conditions of coastal shellfish and shellfish growing waters in South Carolina to ensure that the health of shellfish consumers is protected. All shellfish waters receive one of the following harvest classifications:

Approved area classification shall be determined upon a sanitary survey which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. Growing areas shall be classified approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which render shellfish unsafe for human consumption.

Conditionally Approved growing areas are subject to temporary conditions of actual or potential pollution. When such events are predictable as in the malfunction of wastewater treatment facilities, nonpoint source pollution from rainfall runoff, discharge of a major river, potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department, prior to classifying an area as conditionally approved. Shellfish shall not be directly marketed from a conditionally approved area until conditions for an approved classification have been met for a time that should insure the shellfish are safe for consumption. Shellstock from conditionally approved areas which have been subjected to temporary conditions of actual or potential pollution may be relayed to approved areas for purification or depurated through controlled purification operations only by special permit issued by the Department.

Restricted growing areas show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or a such a frequency that a conditionally approved area classification is not feasible. Shellfish may be harvested from areas classified as restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision.

Conditionally Restricted growing areas are subject to temporary conditions of actual or potential pollution. When such events are predictable as in the malfunction of wastewater treatment facilities, nonpoint source pollution from rainfall runoff, discharge of a major river, potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department, prior to classifying an area as conditionally restricted. Shellfish may be harvested from areas

classified as conditionally restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision.

Prohibited growing areas include those for which there is no current sanitary survey, or for which monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area, or indicate that such substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

Evaluation of growing areas is conducted annually; routine monitoring is conducted monthly. Shellfish monitoring sites are described in Appendix C. and located on the watershed maps in Appendix D. For current information on growing area classifications, contact SCDHEC s Shellfish Sanitation Program at 843-740-1590 (Charleston) or 803-898-4300.

Water Quality Indicators

Water quality data are used to describe the condition of a waterbody, to help understand why that condition exists, and to provide some clues as to how it may be improved. Water quality indicators include physical, chemical, and biological measurements. Copies of the Standard Operating Procedures used for these measurements are available from the Department's Bureau of Water and the Bureau of Environmental Services.

MACROINVERTEBRATE COMMUNITY

Macroinvertebrates are aquatic insects and other aquatic invertebrates associated with the substrates of waterbodies (including, but not limited to, streams, rivers, tidal creeks, and estuaries). Macroinvertebrates can be useful indicators of water quality because these communities respond to integrated stresses over time which reflect fluctuating environmental conditions. Community responses to various pollutants (e.g. organic, toxic, and sediment) may be assessed through interpretation of diversity, known organism tolerances, and in some cases, relative abundances and feeding types.

FISH TISSUE

Many pollutants occur in such low concentrations in the water column that they are usually below analytical detection limits. Over time many of these chemicals may accumulate in fish tissue to levels that are easily measured. By analyzing fish tissue it is possible to see what pollutants may be present in waterbodies at very low levels. This information can also be used to determine if consumption of the fish pose any undue human health concerns and to calculate consumption rates that are safe.

DISSOLVED OXYGEN

Oxygen is essential for the survival and propagation of aquatic organisms. If the amount of oxygen dissolved in water falls below the minimum requirements for survival, aquatic organisms or their eggs and larvae may die. A severe example is a fish kill. Dissolved oxygen (DO) varies greatly due to

natural phenomena, resulting in daily and seasonal cycles. Different forms of pollution also can cause declines in DO.

Changes in DO levels can result from temperature changes or the activity of plants and other organisms present in a waterbody. The natural diurnal (daily) cycle of DO concentration is well documented. Dissolved oxygen concentrations are generally lowest in the morning, climbing throughout the day due to photosynthesis and peaking near dusk, then steadily declining during the hours of darkness.

There is also a seasonal DO cycle in which concentrations are greater in the colder, winter months and lower in the warmer, summer months. Streamflow (in freshwater) is generally lower during the summer and fall, and greatly affects flushing, reaeration, and the extent of saltwater intrusion, all of which affect dissolved oxygen values.

BIOCHEMICAL OXYGEN DEMAND

Five-day biochemical oxygen demand (BOD_5) is a measure of the amount of dissolved oxygen consumed by the decomposition of carbonaceous and nitrogenous matter in water over a five-day period. The BOD_5 test indicates the amount of biologically oxidizable carbon and nitrogen that is present in wastewater or in natural water. Matter containing carbon or nitrogen uses dissolved oxygen from the water as it decomposes, which can result in a dissolved oxygen decline. The quantity of BOD_5 discharged by point sources is limited through the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The discharge of BOD_5 from a point source is restricted by the permits so as to maintain the applicable dissolved oxygen standard.

PH

pH is a measure of the hydrogen ion concentration of water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14 standard units (SU). A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic.

Low pH values are found in natural waters rich in dissolved organic matter, especially in Coastal Plain swamps and black water rivers. The tannic acid released from the decomposition of vegetation causes the tea coloration of the water and low pH.

High pH values in lakes during warmer months are associated with high phytoplankton (algae) densities. The relationship between phytoplankton and daily pH cycles is well established. Photosynthesis by phytoplankton consumes carbon dioxide during the day, which results in a rise in pH. In the dark, phytoplankton respiration releases carbon dioxide. In productive lakes, carbon dioxide decreases to very low levels, causing the pH to rise to 9-10 SU. Continuous flushing in streams prevents the development of significant phytoplankton populations and the resultant chemical changes in water quality.

FECAL COLIFORM BACTERIA

Coliform bacteria are present in the digestive tract and feces of all warm-blooded animals, including humans, poultry, livestock, and wild animal species. Fecal coliform bacteria are themselves generally not harmful, but their presence indicates that surface waters may contain pathogenic microbes. Diseases that can be transmitted to humans through water contaminated by improperly treated human or animal waste are the primary concern. At present, it is difficult to distinguish between waters contaminated by animal waste and those contaminated by human waste.

Public health studies have established correlations between fecal coliform numbers in recreational and drinking waters and the risk of adverse health effects. Based on these relationships, the USEPA and SCDHEC have developed enforceable standards for surface waters to protect against adverse health effects from various recreational or drinking water uses. Proper waste disposal or sewage treatment prior to discharge to surface waters minimizes this type of pollution.

NUTRIENTS

Oxygen demanding materials and plant nutrients are common substances discharged to the environment by man's activities, through wastewater facilities and by agricultural, residential, and stormwater runoff. The most important plant nutrients, in terms of water quality, are phosphorus and nitrogen. In general, increasing nutrient concentrations are undesirable due to the potential for accelerated growth of aquatic plants, including algae. Nuisance plant growth can create imbalances in the aquatic community, as well as aesthetic and access issues. High densities of phytoplankton (algae) can cause wide fluctuations in pH and dissolved oxygen. South Carolina has narrative standards for nutrients in water and the USEPA has issued recommendations for phosphorus concentrations to prevent over-enrichment.

The forms of nitrogen routinely analyzed at SCDHEC stations are ammonia and ammonium nitrogen (NH_3/NH_4), total Kjeldahl nitrogen (TKN), and nitrite and nitrate nitrogen (NO_2/NO_3). Ammonia and ammonium are readily used by plants. TKN is a measure of organic nitrogen and ammonia in a sample. Nitrate is the product of aerobic transformation of ammonia, and is the most common form used by aquatic plants. Nitrite is usually not present in significant amounts.

Total phosphorus (TP) is commonly measured to determine phosphorus concentrations in surface waters. TP includes all of the various forms of phosphorus (organic, inorganic, dissolved, and particulate) present in a sample.

TURBIDITY

Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, soluble colored organic compounds, and plankton and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. It is an important consideration for drinking water as finished water has turbidity limits.

TOTAL SUSPENDED SOLIDS

Total Suspended Solids (TSS) are the suspended organic and inorganic particulate matter in water. Although increasing TSS can also be an indication of increased runoff from land, TSS differs from turbidity in that it is a measure of the mass of material in, rather than light transmittance through, a water sample. High TSS can adversely impact fish and fish food populations and damage invertebrate populations. There are no explicit State standards for TSS.

HEAVY METALS

Concentrations of cadmium, chromium, copper, lead, mercury, and nickel in water are routinely measured by the Department to compare to State standards intended to protect aquatic life and human health. These metals occur naturally in the environment, and many are essential trace elements for plants and animals. Human activities, such as land use changes and industrial and agricultural processes, have resulted in an increased flux of metals from land to water. Atmospheric inputs are recognized as important sources of metals to aquatic systems. Metals are released to the atmosphere from the burning of fossil fuels (coal, oil, gasoline), wastes (medical, industrial, municipal), and organic materials. The metals are then deposited on land and in waterways from the atmosphere via rainfall and attached to particulates (dry deposition).

Assessment Methodology

The Watershed Water Quality Assessment is a geographically-based document that describes, at the watershed level, water quality as well as conditions and activities related to water quality. This section provides an explanation of the information assessment methodology used to generate the watershed-level summaries. Water quality data summaries used in this assessment are presented in Appendices A and B.

USE SUPPORT DETERMINATION

At the majority of SCDHEC's surface water monitoring stations, samples for analysis are collected as surface grabs once per month, quarter, or year, depending on the parameter. Grab samples collected at a depth of 0.3 meters are considered surface measurements, and are used to establish representative physical conditions and chemical concentrations in the waterbodies sampled. At most stations sampled by boat, dissolved oxygen and temperature are sampled as a water column profile, with measurements being made at a depth of 0.3 meters below the water surface and at one-meter intervals to the bottom. At stations sampled from bridges, these parameters are measured only at a depth of 0.3 meters. All water and sediment samples are collected and analyzed according to standard procedures. Macroinvertebrate community structure is analyzed routinely at selected stations as a means of detecting adverse biological impacts on the aquatic fauna due to water quality conditions which may not be readily detectable in the water column chemistry.

For the purpose of assessment, only results from surface samples are used in water quality standards comparisons and trend assessments. This information is considered to represent "average"

conditions, as opposed to extremes, because of the inability to target individual high or low flow events on a statewide basis. Results from water quality samples can be compared to State standards and USEPA criteria, with some restrictions due to time of collection and sampling frequency. The monthly sampling frequency employed in the ambient monitoring network may be insufficient for strict interpretation of certain standards. The USEPA does not define the sampling method or frequency other than indicating that it should be "representative." A grab sample is considered to be representative for indicating excursions relative to standards: a single grab sample is more representative of a one-hour average than a four-day average, more representative of a one-day average than a one-month average, and so on (see also Screening & Additional Considerations for Water Column Metals below). When the sampling method or frequency does not agree with the intent of the particular standard, conclusions about water quality should be considered as only an indication of conditions. The time period used to assess standards compliance is the most recent complete five years of data, which for the Santee River Basin is 1994 through 1998.

AQUATIC LIFE USE SUPPORT

One important goal of the Clean Water Act and State standards is to maintain the quality of surface waters in order to provide for the survival and propagation of a balanced indigenous aquatic community of fauna and flora. The degree to which aquatic life is protected (aquatic life use support) is assessed by comparing important water quality characteristics and the concentrations of potentially toxic pollutants with standards. Aquatic life use support is based on the percentage of standards excursions at a sampling site, and where data are available, the composition and functional integrity of the biological community. For lakes, support of aquatic life uses is also evaluated using a measure of trophic state. A number of waterbodies have been given specific standards for pH and dissolved oxygen, which reflect natural conditions.

For assessment purposes, a dissolved oxygen (DO) standard of not less than 4 mg/l is used for Class SB and a daily average not less than 5 mg/l with a low of 4 mg/l is used for all other Classes. The term excursion is used to describe a DO concentration measurement of less than the stated standard. Dissolved oxygen and pH may vary from the ranges specified in the standards due to a variety of natural causes.

For pH, there are several acceptable ranges applied depending on the Class of water: 6-8 SU for TPGT; 6-8.5 SU for FW; 5-8.5 SU for FW*; and 6.5-8.5 for SFH, SA, and SB. For DO and pH, if 10 percent or less of the samples contravene the appropriate standard, then aquatic life uses are said to be fully supported. A percentage of standards excursions between 11-25 is considered partial support, and a percentage greater than 25 is considered to represent nonsupport, unless excursions are due to natural conditions.

When comparing sampling data to DO standards, it is necessary to consider sampling bias due to season or tide stage. Samples are collected as a single instantaneous grab sample, which is not truly representative of the daily average used as the criterion for most classifications. Secondary stations are sampled only during summer months and generally experience a higher percentage of DO excursions as

a result. It is essential to examine the data to ascertain such patterns of excursions before summarily concluding that the indicated violations constitute poor water quality.

For any individual toxicant (heavy metals, priority pollutants, chlorine, ammonia), if the acute aquatic life standard is exceeded in more than 10 percent of the samples, based on at least ten samples, aquatic life uses are not supported. If the acute aquatic life standard is exceeded more than once, but in less than or equal to 10 percent of the samples, uses are partially supported. If fewer than ten samples were collected, discretion must be used and other factors considered, such as the magnitude of the excursions or number of toxicants with excursions. In such a circumstance, the site is prioritized for the collection of biological data, or additional monitoring and investigation, to verify the true situation. Biological data are the ultimate deciding factor for determining support of aquatic life uses, regardless of chemical conditions.

MACROINVERTEBRATE DATA INTERPRETATION

Macroinvertebrate community assessments are used, where available, to supplement or verify Aquatic Life Use Support determinations and to evaluate potential impacts from the presence of sediment contaminants. Aquatic and semi-aquatic macroinvertebrates are identified to the lowest practical taxonomic level depending on the condition and maturity of specimens collected. The EPT Index and the North Carolina Biotic Index are the main indices used in analyzing macroinvertebrate data. To a lesser extent, taxa richness and total abundance may be used to help interpret data.

The EPT Index or the Ephemeroptera (mayflies) - Plecoptera (stoneflies) - Trichoptera (caddisflies) Index is the total taxa richness of these three generally pollution-sensitive orders. EPT values are compared with least impacted regional sites. The Biotic Index for a sample is the average pollution tolerance of all organisms collected, based on assigned taxonomic tolerance values. A database is currently being developed to establish significant EPT index levels to be used in conjunction with the Biotic Index to address aquatic life use support.

Taxa richness is the number of distinct taxa collected and is the simplest measure of diversity. High taxa richness is generally associated with high water quality. Increasing levels of pollution progressively eliminate the more sensitive taxa, resulting in lower taxa richness. Total abundance is the enumeration of all macroinvertebrates collected at a sampling location. This is generally not regarded as a qualitative metric. However, when gross differences in abundance occur between stations this metric may be considered as a potential indicator.

RECREATIONAL USE SUPPORT

The degree to which the swimmable goal of the Clean Water Act is attained (recreational use support) is based on the frequency of fecal coliform bacteria excursions, defined as greater than 400/100 ml for all surface water classes. Comparisons to the bacteria geometric mean standard are not considered appropriate based on sampling frequency and the intent of the standard. If 10 percent or less of the samples are greater than 400/100 ml then recreational uses are said to be fully supported. A

percentage of standards excursions between 11-25% is considered partial support of recreational uses, and greater than 25% is considered to represent nonsupport of recreational uses.

FISH CONSUMPTION USE SUPPORT

The Department uses a risk-based approach to evaluate contaminant concentrations in fish tissue and to issue consumption advisories in affected waterbodies. This approach contrasts the average daily exposure dose to the reference dose (RfD). Using these relationships, fish tissue data are interpreted by determining the consumption rates that would not be likely to pose a human health threat.

Fish consumption use support is determined by the occurrence of advisories on consumption for a waterbody. For the support of fish consumption uses, a fish consumption advisory which limits consumption for the general population or a subpopulation at greater risk (e.g. pregnant women, children) indicates partial use support. A do not eat any consumption advisory for one or more species for the general population or subpopulation at greater risk indicates nonsupport of uses.

For background information and the most current advisories please visit the Bureau of Water homepage at http://www.state.sc.us/dhec/eqc/water/ and click on "Advisories" under the Water Subject Index, or go directly to http://www.state.sc.us/dhec/eqc/admin/html/fishadv.html. For more information or a hard copy of the advisories, call SCDHEC's Division of Health Hazard Evaluation toll-free at (888) 849-7241.

HUMAN HEALTH STANDARDS

State standards for human health are also evaluated in the preparation of the Watershed Water Quality Assessments. For contaminants with human health standards (e.g. heavy metals, pesticides), a potential human health threat is indicated if the median concentration exceeds the standard.

Additional Screening and Prioritization Tools

Evaluation of water quality data and other supplemental information facilitates watershed planning. Information from the following sources is used to develop watershed-based protection and prevention strategies.

LONG-TERM TREND ASSESSMENT

As part of the watershed water quality assessments, surface data from each station are analyzed for statistically significant long-term trends using a modification of Kendall's tau, which is a nonparametric test removing seasonal effects. Flows are not available for most stations, and the parametric concentrations are not flow-corrected. Seasonal Kendall's tau analysis is used to test for the presence of a statistically significant trend of a parameter, either increasing or decreasing, over a fifteen year period. It indicates whether the concentration of a given parameter is exhibiting consistent change in one direction over the specified time period. A two sided test at $p=0.1$ is used to determine statistically significant trends, and the direction of trend. An estimate of the magnitude of any statistically significant trend is calculated.

A rigorous evaluation for trends in time-series data usually includes a test for autocorrelation. The data are not tested for autocorrelation prior to the trend analysis. It is felt that autocorrelation would not seriously compromise a general characterization of water quality trends based on such a long series of deseasonalized monthly samples.

One of the advantages of the seasonal Kendall test is that values reported as being below detection limits (DL) are valid data points in this nonparametric procedure, since they are all considered to be tied at the DL value. When the DL changed during the period of interest, all values are considered to be tied at the highest DL occurring during that period. Since it is possible to measure concentrations equal to the value of the DL, values less than DL are reduced by subtraction of a constant so that they remain tied with each other, but are less than the values equal to the DL. Since fecal coliform bacteria detection limits vary with sample dilution, there is no set DL; therefore, for values reported as less than some number, the value of the number is used.

For the purposes of this assessment, long-term trends in selected parameters were examined using data collected from 1984 through 1998. In 1992 a phosphate detergent ban was instituted in South Carolina, so for total phosphorus a second trend assessment is included for the period 1992 through 1998. For total phosphorus it is this second time period that is reported in the text.

SEDIMENT SCREENING

There are no sediment standards; therefore, in order to identify sediments with elevated metals concentrations, percentiles are constructed using five years of statewide sediment data. Only values greater than the detection limit were used for chromium, copper, nickel, lead, and zinc. Because so few concentrations of cadmium and mercury are measured above the detection limit, all samples were pooled for these metals. A sediment metal concentration is considered to be high if it is in the top 10% of the pooled results, and very high if it is in the top 5%. Any analytical result above detection limits is flagged for pesticides, PCBs, and other priority pollutants. Sites with noted high metals concentrations or the occurrence of other contaminants above detection limits are prioritized for the collection of biological data, or additional monitoring and investigation, to verify the true situation.

For saltwater sediments, national studies have been conducted by the National Oceanic and Atmospheric Administration (NOAA) and the State of Florida which have developed Sediment Quality Guidelines (SQGs) for the United States and the southeastern region. These SQGs summarize all published toxicology and biomonitoring studies for a given contaminant and ranked them from lowest to highest concentration where an adverse effect was observed. The tenth percentile of the ranked data, from all published studies which reported an adverse effect, is termed the Effects Range Low (ERL) or Threshold Effects Level (TEL) and represents the threshold concentration for toxicity to occur. The median concentration where adverse effects in benthos are observed (the fiftieth percentile) is termed the Effects Range Median (ERM) or Probable Effects Levels (PEL). Measured sediment contaminant levels may be compared with ERLs/ERMs or TELs/PELs to predict potential probability for sediment bound contaminants to cause toxicity in benthic faunal communities. Saltwater sediment contaminant levels were compared with existing sediment quality guidelines by both individual compound. Sites with

sediments which had individual chemical contaminant concentrations which exceeded ERL/TEL and ERM/PEL guideline levels are identified to indicate that trace metal, pesticide, PAH or PCB concentrations exceeded levels potentially toxic to estuarine organisms.

WATER COLUMN METALS ANALYSES

The USEPA criteria for heavy metals to protect aquatic life are specified as a four-day average and a one-hour average, and have been adopted as State standards. Because of the quarterly sampling frequency for heavy metals, comparisons to chronic toxicity standards (four-day average concentration) are not considered appropriate; therefore, only the acute standard (one-hour average) for the protection of aquatic life is used in the water quality assessment (Table 1).

Zinc and copper are elevated in surface waters statewide and concentrations are frequently measured in excess of the calculated acute aquatic life standards. To identify areas where zinc, copper, and other metals are elevated in the water column above normal background concentrations, concentrations greater than the detection limit from all SCDHEC monitoring sites statewide for a five year period are pooled and the 90th and 95th percentiles are computed. This is done separately for each metal for both fresh and saltwaters. The individual measurements from each monitoring station are then compared to these percentiles, as well as to State standards. As in sediments, a metal concentration is referred to as "high" if it is in the top 10% of the pooled results, and "very high" if it is in the top 5%. All water column values referred to as "high" or "very high" are also in excess of the acute aquatic life standard listed in Table 1. For chromium, because so few concentrations are above the detection limit, all samples collected are used to generate the percentiles. Sites with high metals concentrations are prioritized for the collection of biological data, or additional monitoring and investigation, to verify the true situation.

Table 1. Metal Standards in Water (μg/l)

Metal	Present Detection Level	Freshwater 1Hr. Acute Ave.	Saltwater 1Hr. Acute Ave.	Human Health
*Cadmium	10.0	1.79	43.0	5.00
Chromium (VI)	10.0	16.00	1100.0	100.00
*Copper	10.0	9.22	2.9	
*Lead	50.0	33.78	140.0	
Mercury	0.2	2.40	2.1	0.15
*Nickel	20.0	789.00	75.0	100.00

*Zinc	10.0	65.00	95.0	5000.00
* Freshwater standards based on a hardness of 50 mg/l as $CaCO_3$.				

The analytical procedures used by the Department yield total metal concentration, which is a relatively conservative measure, since the total metal concentration is always greater than the acid-soluble or dissolved fraction. Most heavy metal criteria for freshwater are calculated from formulas using water hardness. The formulas used to calculate criteria values are constructed to apply to the entire United States, including Alaska and Hawaii. As with all the USEPA criteria, there is also a large margin of safety built into the calculations. The applicability of the hardness-based criteria derived from the USEPA formulas to South Carolina waters has been a subject of much discussion. Hardness values vary greatly nationwide (from zero into the hundreds), with South Carolina representing the lower end of the range (statewide average value is approximately 20 mg/l). Representatives of the USEPA Region IV standards group have stated that no toxicity data for hardness values less than 50 mg/l were used in the development of the formulas. They have expressed reservations about the validity of the formulas when applied to hardness values below 50 mg/l. Based on this opinion, South Carolina's State standards for metals are based on a hardness of 50 mg/l for waters where hardness is 50 mg/l or less, resulting in several criteria values below the Department's current analytical detection limits. Therefore, any detectable concentration of cadmium, copper, or lead is an excursion beyond recommended criteria.

The SCDHEC monitoring data have historically indicated that zinc and copper levels in South Carolina waters are elevated relative to USEPA criteria, apparently a statewide phenomenon in both fresh and salt waters, and possibly resulting from natural conditions, nonpoint sources, or airborne deposition. These levels do not appear to adversely affect state fisheries or macroinvertebrate communities, which suggests that the levels are the result of long-term local conditions to which the fauna have adapted, as opposed to point source pollution events. It is difficult to assess the significance of heavy metal excursions due to the questionable applicability of the formulas at low hardness values and calculated criteria below present detection limits.

NPDES Program

The Water Facilities Permitting Division and the Industrial, Agricultural, and Stormwater Permitting Division are responsible for drafting and issuing National Pollutant Discharge Elimination System (NPDES) permits. Facilities are defined as either "major" or "minor". For municipal permits, a facility is considered a "major" if it has a permitted flow of 1 MGD or more and is not a private facility. The determination for industrial facilities is based on facility and stream characteristics, including toxicity, amount of flow, load of oxygen, proximity of drinking water source, potential to exceed stream standards, and potential effect on coastal waters.

Permitting Process

A completed draft permit is sent to the permittee, the SCDHEC District office, and if it is a major permit, to the USEPA for review. A public notice is issued when the permit draft is finalized. Comments from the public are considered and, if justified, a public hearing may be arranged. Both oral and written comments are collected at the hearing, and after considering all information, the Department staff make the decision whether to issue the permit as drafted, issue a modified permit, or to deny the permit. Everyone who participated in the process receives a notice of the final decision. A copy of the final permit will be sent to anyone who requests it. Staff decisions may be appealed according to the procedures in R.61-72.

The permitting Divisions use general permits with statewide coverage for certain categories of NPDES permits. Discharges covered under general permits include utility water, potable surface water treatment plants, potable groundwater treatment plants with iron removal, petroleum contaminated groundwater, and mine dewatering activities. Additional activities proposed for general permits include bulk oil terminals, aquacultural facilities, and ready-mix concrete/concrete products. Land application systems for land disposal and lagoons are also permitted.

Wasteload Allocation Process

A wasteload allocation (WLA) is the portion of a stream's assimilative capacity for a particular pollutant which is allocated to an existing or proposed point source discharge. Existing WLAs are updated during the basin review process and included in permits during the normal permit expiration and reissuance process. New WLAs are developed for proposed projects seeking a discharge permit or for existing discharges proposing to increase their effluent loading at the time of application. Wasteload allocations for oxygen demanding parameters are developed by the Water Quality Modeling Section, and WLAs for toxic pollutants and metals are developed by the appropriate permitting division.

The ability of a stream to assimilate a particular pollutant is directly related to its physical and chemical characteristics. Various techniques are used to estimate this capacity. Simple mass balance/dilution calculations may be used for a particular conservative (nondecaying) pollutant while complex models may be used to determine the fate of nonconservative pollutants that degrade in the environment. Waste characteristics, available dilution, and the number of discharges in an area may, along with existing water quality, dictate the use of a simple or complex method of analysis. Projects which generally do not require complex modeling include: groundwater remediation, noncontact cooling water, mine dewatering, air washers, and filter backwash.

Streams are designated either effluent limited or water quality limited based on the level of treatment required of the dischargers to that particular portion of the stream. In cases where the USEPA published effluent guidelines and the minimum treatment levels required by law are sufficient to maintain instream water quality standards, the stream is said to be effluent limited. Streams lacking the assimilative capacity for a discharge at minimum treatment levels are said to be water quality limited. In cases where better than technology limits are required, water quality, not minimum requirements, controls the permit limits. The Department's Water Quality Modeling Section recommends limits for

numerous parameters including ammonia nitrogen (NH3-N), dissolved oxygen (DO), total residual chlorine (TRC), and five-day biochemical oxygen demand (BOD5). Limits for other parameters, including metals, toxics, and nutrients are developed by the Water Facilities Permitting Division or the Industrial, Agricultural, and Stormwater Permitting Division in conjunction with support groups within the Department.

Nonpoint Source (NPS) Management Program

NPS water pollution, sometimes called runoff pollution or polluted runoff does not result from a discharge at a specific, single location (or point), but generally comes from diffuse, numerous sources. Runoff occurring after a rain event may transport sediment from plowed fields, construction sites, or logging operations, pesticides and fertilizers from farms and lawns, motor oil and grease deposited on roads and parking lots, or bacteria containing waste from agricultural animal facilities or malfunctioning septic systems. The rain moves the pollutants across the land to the nearest waterbody or storm drain where they may impact the water quality in creeks, rivers, lakes, estuaries, and wetlands. NPS pollution may also impact groundwater when it is allowed to seep or percolate into aquifers. Adverse effects of NPS pollution include physical destruction of aquatic habitat, fish kills, interference with or elimination of recreational uses of a waterbody (particularly lakes), closure of shellfish beds, reduced water supply or taste and odor problems in drinking water, and increased potential for flooding because waterbodies become choked with sediment.

Congress recognized the growing problem of nonpoint source pollution in the late 1980s, and added NPS provisions to the federal law. Section 319 of the 1987 Amendments to the Clean Water Act required states to assess the nonpoint source water pollution associated with surface and groundwater within their borders and then develop and implement a management strategy to control and abate the pollution. The first Assessment of Nonpoint Source Pollution in South Carolina accomplished this purpose. The Department s Bureau of Water manages the ongoing State NPS Management Program, which develops strategies and targets waterbodies for priority implementation of management projects. Section 319 funds various voluntary efforts, including watershed projects, which address many aspects of the pollution prevention management measure and provide education, outreach and technical assistance to various groups and agencies. Most of the projects are implemented by cooperating agencies.

Section 6217 of the 1990 Coastal Zone Act Reauthorization Amendments (CZARA) requires states with federally approved Coastal Zone Management Programs to develop Coastal Nonpoint Source Pollution Control Programs. At the federal level, the program is administered and funded jointly by the National Oceanic and Atmospheric Administration (NOAA) and EPA. In South Carolina, the Department's Office of Ocean and Coastal Resource Management and the Bureau of Water are responsible for development and implementation of the program.

Many land activities can individually or cumulatively contribute to NPS pollution. Eight categories of NPS pollution sources have been identified as contributing to water quality degradation in South Carolina: agriculture, forestry, urban areas, marinas and recreational boating, mining, hydrologic

modification, wetlands and riparian areas disturbance, land disposal, and groundwater contamination. There are programs, both regulatory and voluntary, in-place that address all eight categories.

Agriculture

In South Carolina, pesticides, fertilizers, animal waste, and sediment are potential sources of agricultural NPS pollution. Agricultural activities also have the potential to directly impact the habitat of aquatic species through physical disturbances caused by livestock or equipment, and through the management of water. The State has laws and regulations that prevent NPS pollution from several agricultural sources including pesticides and animal waste. Funding programs including those under section 319 grants from EPA, cost share funds from USDA under EQIP and CRP are used to implement best management practices that are not covered under regulations. Agriculture land acreage is quantified in the basin-wide and individual watershed evaluations.

Silviculture

Forests comprise a major portion of South Carolina s land base. Sixty-six percent, or 12.6 million acres, of the State s total land area is in timberland. Silvicultural practices associated with road access, harvest, and regeneration of timber present the most significant potential for NPS pollution. Silvicultural activities have the potential to degrade the State s waters through the addition of sediment, nutrients, organics, elevated temperature, and pesticides. Erosion and subsequent sedimentation are the most significant and widespread NPS problems associated with forestry practices. Sudden removal of large quantities of vegetation through harvesting or silvicultural practices can also increase leaching of nutrients from the soil system into surface waters and groundwaters. Programs to abate or control NPS pollution from forestry activities are primarily the responsibility of the SC Forestry Commission (SCFC) and the United States Department of Agriculture s Forest Service (USFS), with other agencies having supplementary programs. The United States Department of Agriculture s Natural Resources Conservation Service (USDA-NRCS) also provides technical assistance to government, landowners, and land users. Forest land acreage is quantified in the basin-wide and individual watershed evaluations.

Urban Areas

Urbanization has been linked to the degradation of urban waterways. The major pollutants found in runoff from urban areas include sediment, nutrients, oxygen-demanding substances, heavy metals, petroleum hydrocarbons, pathogenic bacteria, and viruses. Suspended sediments constitute the largest mass of pollutant loadings to receiving waters from urban areas. Construction sites are a major source of sediment erosion. Nutrient and bacterial sources of contamination include fertilizer usage, pet wastes, leaves, grass clippings, and faulty septic tanks. Petroleum hydrocarbons result mostly from automobile sources. In the 1980's, the average statewide population growth was 11.7 percent, while the coastal counties had an increase of 22 percent, nearly double the State rate during the same time period. This continuing development and population growth has the potential to make urban runoff the most

significant source of pollution in waters of the State in the future. Urban land acreage is quantified in the basin-wide and individual watershed evaluations.

SCDHEC has a number of statewide programs that address components of urban NPS pollution. The Bureau of Water (BOW) administers four permitting programs which control runoff from new and existing urban sources. These include the Stormwater and Sediment Reduction program, Municipal Separate Storm Sewer System (MS4), Industrial NPDES Stormwater Permits, and the Section 401 water quality certification program (see p.25). Additional controls for urban runoff in the coastal zone are implemented by SCDHEC Oceans and Coastal Resources Management (OCRM) through the State Coastal Zone Management Plan.

The Bureau of Environmental Health s Division of Onsite Wastewater Management administers the Onsite Sewage Disposal System program for the entire State, and oversees the permitting for the installation and management of septic systems. Although not associated with urban land use, this Division permits the septic systems of camping facilities if the facility is not on public sewer. The types of camping facilities that fall into this category through R.61-39 are Resident Camps and Family Camps. Resident camps are organized camps where one or more buildings are provided for sleeping quarters. These camps are typically operated for educational, recreational, religious, or health purposes. Family camps are organized camps where camp sites are provided for use by the general public or certain groups. The camp sewage is discharged into a public collection, treatment and disposal system if available, or an onsite wastewater treatment and disposal system (septic tank) is used. Camp locations are identified in the appropriate watershed evaluations.

Marinas and Recreational Boating

Potential adverse environmental impacts associated with marinas include dissolved oxygen deficiencies and high concentrations of toxic metals in aquatic organisms. In addition, marina construction activities can lead to the physical destruction of sensitive ecosystems and bottom-dwelling aquatic communities. Presently, there are more than 100 marinas in South Carolina, with 68 of them in the coastal zone. The U.S. Army Corps of Engineers and the SCDHEC are responsible for permitting marinas in South Carolina. Within SCDHEC, the two offices which have marina permitting authority are the Office of Ocean and Coastal Resource Management (SCDHEC OCRM) and the Office of Environmental Quality Control (SCDHEC Bureau of Water). SCDHEC OCRM issues critical area permits for marinas within the critical area of the coastal zone. SCDHEC Bureau of Water issues permits for marinas at all other locations within the State and issues Section 401 Water Quality Certifications (see p.25) for marinas statewide. The U.S. Coast Guard and the S.C. Department of Natural Resources (SCDNR) are responsible for managing recreational boating activity.

Mining

South Carolina's mineral production consists of non-fuel minerals that provide raw materials for construction products and a precious metal industry. Portland cement clays (kaolin and brick), sand and gravel, and crushed stone represent the majority of the total mineral value. At the end of FY 1997-1998, there were 495 mining operations in South Carolina affecting more than 19,000 acres. Surface mining has the potential to generate NPS pollution during mineral exploration, mine development extraction, transportation, mining and processing, product storage, waste disposal, or reclamation. Potential nonpoint source impacts related to mining activities generally include hydrologic modification, erosion and sedimentation, water quality deterioration, fish and wildlife disturbances, and public nuisances.

The Department s Bureau of Land and Waste Management has primary regulatory responsibility for mining activities. Within the Bureau, the Division of Mining and Solid Waste Permitting is responsible for administering and implementing the S.C. Mining Act and its associated regulations. The Mining Act serves as part of an overall management plan for NPS pollution from active mines. Mining activities and locations are identified in the appropriate watershed evaluations.

Hydromodification

Hydrologic modification (or hydromodification) is defined as stream channelization, channel modification, and dam construction. These activities can negatively impact water quality, destroy or modify in-stream habitat and increase streambank and shoreline erosion. Two State permits, implemented by the SCDHEC, are involved in the implementation of management measures for hydromodification. A critical area permit is required for coastal waters, saltwater wetlands, and beaches defined as critical areas. A navigable waters permit is required for the remainder of the State. Implementation of State policy for dam construction is similar to control of other hydromodification projects in South Carolina, requiring the same State permits and certifications. In addition, dams may require a State dam safety permit or a State stormwater management and sediment reduction permit.

Wetlands

Twenty-three percent of South Carolina is covered by 4.5 million acres of wetlands. The U.S. Army Corps of Engineers implements the federal program for regulating development in wetlands with guidelines established by EPA. The Corps delineates wetlands and determines which wetlands fall under regulatory jurisdiction and require a federal permit for development. The Wetlands Reserve Program, administered by the NRCS, is designed to restore and protect wetlands. At the state level, the primary focus of wetland regulation is the §401 Water Quality Certification. In the §401 certification process, applications for wetland alterations may be denied or modified due to the special nature of a wetland or the functions that a wetland provides. Wetland impacts must be compensated through restoration, enhancement, preservation, or creation and protected in perpetuity. Future development would be prohibited in these mitigated and legally protected areas. Knowledge of areas that are restricted from development due to mitigation or special water classification is useful in planning future development in a watershed. Wetland acreage is quantified in the basin-wide and individual watershed evaluations.

Land Disposal

Although modern solid waste disposal sites are considered point sources of pollution and regulated, leachate from sanitary landfills and dumps has the potential to pollute large portions of adjacent groundwater. Toxic compounds are commonly a part of the overall composition of landfill leachate, especially when the landfill has been used for the disposal of toxic chemicals. There are currently 140 permitted landfills in South Carolina. This total represents 35 municipal solid waste landfills (MSWLF), 62 industrial waste landfills, 41 construction and demolition (C&D) landfills, one sludge monofill, and one ash monofill. Regulatory authority over solid waste disposal activities resides with the South Carolina Department of Health and Environmental Control (SCDHEC), Bureau of Land and Waste Management. All active and closed industrial and municipal solid waste landfills are identified in the appropriate watershed evaluations.

Land application is a form of recycling because it allows recovery of elements needed for crop production. Land application of biosolids may be beneficial and environmentally sound when applied at the correct agronomic rate. Land applying biosolids can benefit farmers by offsetting the costs of fertilizer and lime while reducing the pressure on existing landfills. SCDHEC s Bureau of Water, Division of Water Monitoring, Assessment and Protection, Groundwater Quality Section conducts a program to prevent, monitor, and correct groundwater contamination from nonpoint source pollution from land application of wastewater biosolids, solids, animal manures, biosolids, and sewage sludge. All active industrial and municipal land applications are identified in the appropriate watershed evaluations.

Groundwater Contamination

All aquifers in the State are potential Underground Sources of Drinking Water and are protected under the S.C. Water Classifications and Standards. Groundwaters are thus protected in a manner consistent with the SCDHEC groundwater protection strategy. Staff hydrogeologists implement a screening program for nonpoint source impacts from pits, ponds, and lagoons associated with the permitted storage, treatment, and disposal of industrial and municipal waste waters. In cases where groundwater impact has been identified in violation of S.C. Water Classifications and Standards, appropriate actions will be coordinated with the facility owner to ensure regulatory compliance. The hydrogeologist coordinates with the facility owner to implement source identification, contaminant extent assessments, initiation of contaminant remediation systems and performance evaluations of corrective actions. In addition to releases from wastewater treatment systems, the staff evaluates releases from other nonpoint sources such as above ground tanks, non- regulated fuel oil tanks, spills and/or leaks. Sites with confirmed groundwater impact will be placed under a Consent Agreement or an Order. For the purposes of this assessment, only groundwater contamination affecting surface waters will be identified in the individual watershed evaluations. The SCDHEC groundwater contamination inventory was used to identify groundwater-related problem areas in the basin. Sites in the inventory are referenced by name and county, and are updated annually.

Water Supply

Water treatment facilities are permitted by the Department for municipal and industrial potable water production. As per the 1983 Water Use Reporting and Coordination Act (Act 282), all water uses over 100,000 gallons per day must report their usage. This includes industrial, agricultural, mining, golf courses, public supply, commercial, recreational, hydro power, thermo power, and nuclear power activities. Intake location and the volume removed from a stream are identified in the watershed evaluations for both municipal (potable) and industrial uses.

Growth Potential and Planning

Land use and management can define the impacts to water quality in relation to point and nonpoint sources. Assessing the potential for an area to expand and grow allows for water quality planning to occur and, if appropriate, increased monitoring for potential impairment of water quality. Indicators used to predict growth potential include water and sewer service, road and highway accessibility, and population trends. These indicators and others were used as tools to determine areas within the Santee River Basin having the greatest potential for impacts to water quality as a result of development.

Many counties in the Santee River Basin lack county wide zoning ordinances; therefore, there is little local regulatory power to influence the direction or magnitude of regional growth. The majority of municipalities have zoning ordinances in place; however, much of the growth takes place just outside the municipal boundaries, where infrastructure is inadequate. Section 208 of the Clean Water Act serves to encourage and facilitate the development and implementation of areawide waste treatment management plans. The §208 Areawide Water Quality Management Plans were completed in great detail during the 1970's and have recently been updated. Information from the updated reports are used in the individual watershed evaluations.

Watershed boundaries extend along topographic ridges and drain surrounding surface waters. Roads are commonly built along ridge tops with the best drainage conditions. Cities often develop in proximity to ridges as a result of their plateau terrain. It is not uncommon, then, to find cities or road corridors located along watershed boundaries, and thus influencing or impacting several watersheds.

Watershed Protection and Restoration Strategies

SCDHEC's Bureau of Water is responsible for ensuring that South Carolina's water is safe for drinking and recreation, and suitable to support aquatic life. This section provides an overview of other important Bureau programs and strategies applied statewide to protect and restore water quality. The point and nonpoint source controls described previously assist with achieving these goals.

Under section 303(d) of the Federal Clean Water Act, each state is required to provide a comprehensive inventory of impaired waters for which existing required pollution controls are not stringent enough to achieve State water quality standards or Federal Clean Water Act goals. This biennial list, commonly referred to as the "303(d) list" is the basis for targeting waterbodies for watershed-based solutions. A copy of the current 303(d) list can be obtained by contacting the Bureau of Water. Several Bureau programs address these impaired streams in an effort to restore them.

Total Maximum Daily Load

A Total Maximum Daily Load (TMDL) is the calculated maximum allowable pollutant loading to a waterbody at which water quality standards are maintained. A TMDL is made up of two main components, a load allocation and a wasteload allocation. A load allocation is the portion of the receiving water's loading capacity attributed to existing or future nonpoint sources or to natural background sources. The waste load allocation is the portion of a receiving water's loading capacity allocated to an existing or future point source.

A TMDL is a means for recommending controls needed to meet water quality standards in a particular water or watershed. Historically, the typical TMDL has been developed as a wasteload allocation, considering a particular waterbody segment, for a particular point source, to support setting effluent limitations. In order to address the combined cumulative impacts of all sources, broad watershed-based TMDLs are now being developed.

The TMDL process is linked to all other State water quality activities. Water quality impairments are identified through monitoring and assessment. Watershed-based investigations result in source identification and TMDL development. TMDLs form links between water quality standards and point and nonpoint source controls. Where TMDLs are established, they constitute the basis for NPDES permits and for strategies to reduce nonpoint source pollution. The effectiveness and adequacy of applied controls are evaluated through continued monitoring and assessment.

Antidegradation Implementation

The State's Antidegradation Policy as part of S.C. Regulation 61-68 is represented by a three-tiered approach to maintaining and protecting various levels of water quality and uses; streams included on the 303(d) list are addressed under Tier 1. Tier 1 antidegradation policies apply to all waters of the State and require that existing uses and the minimum level of water quality for those uses be maintained and protected. Tier 2 policies apply to high water quality where the water quality exceeds the mandatory

minimum levels to support the Clean Water Act's goals of propagation of fish, shellfish, wildlife, and recreation in and on the water. The Department considers all the waters of the State as high quality waters. Tier 3 policies apply to the maintenance of water quality in waters which constitute an Outstanding National Resource Water and do not allow for any permanent permitted dischargers. Outstanding Resource Waters of the State are provided a higher level of protection than Tier 2, but do not meet the requirements of Tier 3.

The antidegradation rules will be implemented for Tier 1 protection when applying narrative standards included in Regulation 61-68 as follows: if nutrient loadings caused a waterbody to be included on the 303(d) list, then the Department will not allow a permitted net increase of loading for the appropriate nutrient(s) until such time as a TMDL is developed for the waterbody. In addition, Tier 1 protection will be implemented when applying numeric standards included in Regulation 61-68 for human health, aquatic life, and organoleptic protection as follows: if a waterbody has been affected by a parameter of concern causing it to be on the 303(d) list, then the Department will not allow a permitted net increase of loading for the parameter of concern unless the concentration will not contribute to a violation of water quality standards. Maintenance of current levels will be achieved by reallocation of existing total loads or by meeting applicable water quality standards at the end-of-pipe. No discharge will be allowed to cause or contribute to further degradation of a 303(d) listed waterbody. This no net increase will be achieved by reallocation of existing total load(s) or by meeting applicable water quality standard(s) at the end-of-pipe.

The Antidegradation Rules apply to both nonpoint source pollution and for point sources into impaired waters. Many activities contributing to nonpoint source pollution are controlled with voluntary measures. The Department implements permitting or certification programs for some of these activities and has the opportunity to ensure compliance with the Antidegradation Rules. The activities of primary concern are land development projects which are immediately adjacent to and discharge runoff or stormwater into impaired waters.

401 Water Quality Certification Program

If a Federal permit for a discharge into waters of the State, including wetlands, is required, the Department must issue Water Quality Certification pursuant to Section 401 of the Federal Clean Water Act. Certification is required for permits issued by the U.S. Army Corps of Engineers for construction in navigable waters and for deposition of dredged or fill material.

Regulation 61-101 presents administrative and technical guidance for the water quality certification program and requires SCDHEC to consider whether or not a project is water dependent; whether or not there are feasible alternatives which will have less adverse consequences on water quality and classified uses; the intended purpose of the project; and all potential water quality impacts of the project, both direct and indirect, over the life of the project. Any project with the potential to affect waters of the State must be conducted in such a manner to maintain the specified standards and classified and existing water uses.

As a routine part of the 401 Water Quality Certification review process, the waterbody in question is identified as impaired or not impaired according to the 303(d) list. If it is impaired, the parameter of concern is noted, along with any steps required to prevent further degradation of the water quality of that waterbody. In an effort to facilitate watershed restoration where appropriate, mitigation for unavoidable wetland impacts is encouraged in areas that improve 303(d) listed waters.

Stormwater Program

Stormwater discharges result from precipitation during rain events. Runoff washes pollutants associated with industrial activities (including construction activity), agricultural operations, and commercial and household sites directly into streams, or indirectly into drainage systems that eventually drain into streams. The SCDHEC Stormwater Permitting Program focuses on pollution prevention to reduce or eliminate stormwater pollution. The Department has general permitting authority for stormwater discharges associated with industrial activity, including construction. General permits SCR000000 and SCR100000 for industrial and construction activities, respectively, require permittees to develop and implement stormwater pollution prevention plans that establish best management practices to effectively reduce or eliminate the discharge of pollutants via stormwater runoff. The Stormwater and Agricultural Permitting Section is responsible for issuing NPDES stormwater permits to prevent degradation of water quality as well as for issuing sediment and erosion control permits for construction sites. SCDHEC's Office of Ocean and Coastal Resource Management manages the State sediment and erosion control in the coastal area.

Regulation 61-9 requires a compilation of all existing State water quality data with STORET data being used as a baseline. If analysis indicates a decrease in water quality then corrective measures must be taken. The permittee will identify all impaired water bodies in a Stormwater Management Plan (SWMP). In addition, existing pollution discharge control methods will be identified and incorporated into the SWMP. Procedures, processes, and methods to control the discharge of pollutants from the municipal separate storm sewer system (MS4) into impaired waterbodies and publicly owned lakes included on the 303(d) list will be described in the SWMP. The effectiveness of these controls will be assessed and necessary corrective measures, if any, shall be developed and implemented.

South Carolina Animal Feeding Operations Strategy

Among the general categories of pollution sources, agriculture ranks as the number one cause of stream and lake impairment nationwide. Many diseases can potentially be contracted from drinking water or coming into contact with waters contaminated with animal wastes. The Department uses SC Regulation 61-43: *Standards for the Permitting of Agricultural Animal Facilities* to address the permitting of animal feeding operations (AFOs). Implementing these regulations and their corresponding compliance efforts are a priority for the Department in order to reduce public health and environmental impacts from AFOs. There are currently no concentrated animal feeding operations (CAFOs) in operation in South Carolina, and approximately 2,000 AFOs. Using the Watershed Program cycle and

the division of the State into five regions, AFOs will be monitored and inspected by region. The 303(d) list will be used to prioritize the inspections. After all the inspections have been made in a region, the Department will move to the next basin in the watershed cycle. The Department is continuing to work in cooperation and coordination with the U.S. Department of Agriculture, the Natural Resources Conservation Service, the South Carolina Department of Agriculture, the South Carolina Soil and Water Conservation Districts, and the Clemson Extension Service.

Sanitary Sewer Overflow Strategy

Sanitary sewers are designed to collect municipal and industrial wastewater, with the allowance for some acceptable level of infiltration and infow, and transport these flows to a treatment facility. When the sewer system is unable to carry these flows, the system becomes surcharged and an overflow will occur. Sanitary sewer overflows (SSOs) have existed since the introduction of separate sanitary sewers, and most are caused by inadequate operation, maintenance, and management of the collection system.

The SSO strategy addresses compliance and enforcement efforts by the Department to ensure compliance by publicly/privately owned treatment plants (PPOTWs) with the requirements of the statutes and their NPDES and ND permits. The Department has initiated a Sanitary Sewer Overflow Compliance and Enforcement Strategy to shift resources historically applied to treatment plant inspections to include evaluations of pump stations and collection systems. To assist evaluators in selecting candidate systems, staff will utilize the 303(d) list of impaired waters to identify waters impacted by fecal coliform or other appropriate pollutants and correlate those with collection systems with incidences of SSOs. The Department's Enforcement Referral Procedures Document will be used to determine when a PPOTW should be referred to enforcement for SSOs. The enforcement process allows for the Department to consider actions taken by the PPOTW such as: timely and proper notification, containment and mitigation of discharge, voluntarily conducting self evaluations, and requests for compliance assistance. The Department will take immediate action where it has been determined that SSOs have occurred and the PPOTW has not made timely and proper notification.

Referral Strategy for Effluent Violations

The Department has developed referral effluent violation guidelines to specifically address discharges into impaired waters. The goal of the referral guidelines is to reduce pollutant discharges into impaired waters in order to ultimately restore them to their full potential usage. To achieve this goal, enforcement actions are initiated earlier in an effort to improve the quality of waters which do not meet standards. If a stream is impaired by a pollutant and the permit limit for that pollutant is exceeded more than once in a running annual reporting period, formal enforcement action will be initiated against the discharger.

SCDHEC s Watershed Stewardship Programs

Public participation is an important component of the Department's Watershed Water Quality Management Program. Benefits to this interaction on the local level include improved public awareness about SCDHEC water programs, and increased local interest and participation in water quality improvement. Described below are some of the Department's water programs that encourage public interest and involvement in water quality.

Source Water Assessment Program

A safe, adequate source of drinking water is key to development of communities and the health of citizens. The Safe Drinking Water Act (SDWA) provides authority to protect sources of drinking water. As a result of the 1996 amendments to the SDWA, source water protection has become a national priority. States are required to develop a plan for assessment of source waters for all federally defined public groundwater and surface water systems.

The Source Water Assessment Program (SWAP) involves determining the boundaries of the areas that are the source of waters for public water systems. For groundwater systems, these areas are defined using groundwater flow models. For surface water systems, the 14-digit Hydrologic Unit Code watershed is the designated protection area (although certain areas within the basin will be segmented as being of greater vulnerability to contamination from overland flow, groundwater contributions to surface water, and direct spills into the surface water). Known and potential sources of contamination in the delineated area must be identified, and the inventoried sources evaluated to determine the susceptibility of public water systems to such contaminants. Assessments must be made available to the public.

Local involvement will be a critical factor in the success of the SWAP, and local government, citizen groups, environmental groups, water suppliers, and the Department must all work together to increase the general public s awareness of where drinking water comes from and how to better protect sources of drinking water. Implementation of source water protection activities will also occur at the local level, and local authorities may wish to base zoning and land-use planning on the source water assessments. The SWAP will be a key part of the Department's watershed management approach. To avoid duplication, information gathered from existing regulatory programs and/or watershed protection efforts will be utilized (e.g., ambient monitoring programs, TMDLs, etc.).

South Carolina Water Watch

South Carolina Water Watch is a unique effort to involve the public and local communities in water quality protection. The Water Watch program was developed to encourage South Carolina's citizens to become stewards of the State's lakes, rivers, streams, estuaries, and wetlands. Volunteers select a water resource on which to focus and perform activities aimed at protecting water quality, such as shoreline surveys, public education, and litter cleanups. The Water Watch coordinator assists participants with materials and training to help make projects successful. SCDHEC invites individuals,

school groups, civic organizations, businesses, and local governments to learn about and protect the quality of our waterways by contacting the Water Watch coordinator at 803-898-4300.

Champions of the Environment

Champions of the Environment is a student recognition program that raises awareness of environmental issues. Nationally recognized for its innovative approach to environmental education, the program promotes hands-on learning by recognizing students working on exemplary environmental projects beyond the realm of the classroom. With scholarships and media coverage, Champions of the Environment encourages student initiative and self-esteem. The program promotes environmental awareness, leadership, conservation, creativity, and self-confidence through activities such as group projects, public speaking, and environmental research. Champions of the Environment is jointly sponsored by Dupont, International Paper, WIS-TV, and SCDHEC. For more information contact the Champions of the Environment coordinator at 803-898-4300.

Clean Water State Revolving Fund

Congress created the Clean Water State Revolving Fund (SRF) in 1987, to replace the §201 Construction Grants program. In doing so, 'state banks' were created to lend money for virtually any type of water pollution control infrastructure project. Project types include construction of wastewater treatment systems and nonpoint source pollution control. The interest rate on the loans is always below the current market rate. As repayments are made on the loans, funds are recycled to fund additional water protection projects. The vast majority of the SRF funds have been used for the construction of traditional municipal wastewater treatment systems. Because of its inherent flexibility, the SRF program is well suited to accommodate the watershed approach.

SRF loans are available to units of state, local, and regional government, and special purpose districts. South Carolina law prevents loans from being made directly to private organizations and individuals. Local governments such as cities and counties and other units of government such as Soil and Water Conservation Districts, Councils of Government, and Water and Sewer Districts are encouraged to apply for SRF loans for nonpoint source projects. Nonpoint source projects may include construction and maintenance of stormwater management facilities, establishment of a stormwater utility, purchase of land for wetlands and riparian zones, and implementation of source water protection assessments. For more information contact the State Revolving Fund coordinator at 803-898-4300.

Citizen-Based Watershed Stewardship Programs

Throughout the Santee River Basin, water quality is a common interest among citizen groups. The issues and membership of these groups vary widely. Some of the citizen groups interested in water quality in the Santee River Basin are described below.

Lake Marion Association

The Lake Marion Association is a non-profit corporation dedicated to enhancing the environmental and recreational quality of Lake Marion through cooperative efforts with local, state, and federal agencies. Recent activities have included Beach/River Sweeps, involvement in aquatic plant management projects, and Plus One Boating.

Coastal Conservation League (CCL)

The CCL is a grassroots organization with the primary goal of environmental protection of the South Carolina Coastal Zone. The organization is active in promotion of smart growth initiatives and other land use issues, wetlands protection, water quality, and a variety of other issues. A legislative liaison is active at the state level to promote environmentally sound public policy.

Ashley River Scenic River Task Force

As part of the S.C. Scenic Rivers Program, an advisory council was formed to develop a plan for managing the Ashley River Corridor. The advisory council, sponsored by the South Carolina Department of Natural Resources, is composed of local land owners, conservation organizations, business representatives, and natural resource agency personnel. The council will propose recommendations for managing the natural, cultural, recreational, and historical assets of the Ashley Scenic River area.

Ashley River Conservation Coalition

An organization formed to create a vision for the future of the Ashley River Historic District and to develop strategies for the achievement of the vision. Original members of the coalition were Drayton Hall, Middleton Place Foundation, Westvaco, SCPRT, Historic Charleston, and the Lowcountry Open Land Trust. The Coalition successfully petitioned for Scenic River status for the Ashley River.

Clean Water Council

A citizen-based watershed stewardship organization concerned with the water quality issues affecting the East Cooper River area including Mt. Pleasant, Sullivans Island, and The Isle of Palms. They are active in volunteer water quality monitoring for the identification of sources of runoff pollution.

Land Trusts

Both the Lord Berkeley Land Trust and the Low Country Open Land Trust have been active in the Santee River basin. Efforts are geared towards acquiring property or easements for the preservation of natural areas.

Santee River Basin Description

The ***Santee River Basin*** encompasses 11 watersheds and 1,279 square miles. The Santee River Basin originates in the Upper Coastal Plain region of the State giving way to the Lower Coastal Plain and the Coastal Zone regions. Of the nearly one million acres, 42.5% is forested land, 16.1% is forested wetland, 12.4% is scrub/shrub land, 11.7% is water, 11.7% is agricultural land, 4.6% is nonforested wetland, 0.5% is barren land, and 0.5% is urban land. There are a total of 934.4 stream miles, 94,664 acres of lake waters, and 5,275.6 acres of estuarine areas in the Santee River Basin. The Santee River is formed from the confluence of the Congaree and Wateree Rivers and flows through Lake Marion. The river is diverted in lower Lake Marion, and either flows out of the Santee dam to eventually drain into the Atlantic Ocean via the South Santee River and the North Santee River, or is channeled along a 7.5 mile diversion canal to fill Lake Moultrie. After flowing through the Santee dam, the Santee River is joined by the rediversion canal connecting Lake Moultrie and the (lower) Santee River.

Physiographic Regions

The State of South Carolina has been divided into six Major Land Resource Areas (MLRAs) by the USDA Soil Conservation Service. The MLRAs are physiographic regions that have soils, climate, water resources and land uses in common. The physiographic regions that define the Santee River Basin are as follows.

The **Upper Coastal Plain** is an area of gentle slopes with increased dissection and moderate slopes in the northwestern section that contain the State's major farming areas; elevations range from 100 to 450 feet.

The **Lower Coastal Plain** is an area that is mostly nearly level and is dissected by many broad, shallow valleys with meandering stream channels; elevations range from 25 to 125 feet.

The **Coastal Zone** is a mostly tidally-influenced area that is nearly level and dissected by many broad, shallow valleys with meandering stream channels; most of the valleys terminate in tidal estuaries along the coast; elevations range from sea level to about 25 feet.

Land Use/Land Cover

General land use/land cover data for South Carolina were derived from SCDNR 1990 SPOT multispectral satellite images using image mapping software to inventory the State's land classifications, which are as follows.

Urban land is characterized by man-made structures and artificial surfaces related to industrial, commercial and residential uses, as well as vegetated portions of urban areas.

Agricultural/Grass land is characterized by cropland, pasture and orchards, and may include some grass cover in Urban, Scrub/Shrub and Forest areas.

Scrub/Shrub land is adapted from the western Rangeland classification to represent the "fallow" condition of the land (currently unused, yet vegetated), and is most commonly found in the dry Sandhills region including areas of farmland, sparse pines, regenerating forest lands and recently harvested timber lands.

Forest land is characterized by deciduous and evergreen trees not including forests in wetland settings.

Forested Wetland (swampland) is the saturated bottomland, mostly hardwood forests that are primarily composed of wooded swamps occupying river floodplains and isolated low-lying wet areas, primarily located in the Coastal Plain.

Nonforested Wetland (marshland) is dependent on soil moisture to distinguish it from Scrub/Shrub since both classes contain grasses and low herbaceous cover; nonforested wetlands are most common along the coast and isolated freshwater areas found in the Coastal Plain.

Barren land is characterized by an unvegetated condition of the land, both natural (rock, beaches and unvegetated flats) and man-induced (rock quarries, mines and areas cleared for construction in urban areas or clearcut forest areas).

Water (non-land) includes both fresh and tidal waters.

Soil Types

The dominant soil associations, or those soil series comprising, together, over 40% of the land area, were recorded for each watershed in percent descending order. The watersheds all contained up to 6-24 additional soil series not listed that made up the remaining land area percentage. The individual soil series for the Santee River Basin are described as follows.

Bladen soils are poorly drained soils on low, nearly level areas and low ridges.

Bohicket soils are very poorly drained soils, clayey throughout or mucky and underlain with clayey layers, frequently flooded.

Bonneau soils are deep, moderately well drained soils with loamy subsoil on ridges.

Cantey soils are moderately well drained soils with a loamy surface layer and a clayey or loamy subsoil and poorly drained soils with a loamy surface layer and a clayey subsoil.

Capers soils are very poorly drained soils, clayey throughout or mucky, and underlain with clayey layers, frequently flooded.

Chastain soils are poorly drained to well drained soils that are clayey or loamy throughout and are subject to flooding.

Chipley soils are moderately to excessively well drained soils, sandy throughout, on high ridges.

Emporia soils are well drained, gently sloping soils with surface and subsoils of loamy fine sand.

Faceville soils are well drained, sandy soils with a loamy or clayey subsoil.

Goldsboro soils are moderately well to poorly drained soils with loamy subsoil on nearly level ridges and in shallow depressions.

Hobcaw soils are nearly level, very poorly drained soils in depressions.

Leon soils are somewhat poorly drained to poorly drained, level to nearly level, sandy soils with weakly cemented layers stained by organic matter.

Levy soils are nearly level, very poorly drained soils, mucky throughout or loamy and underlain with clayey layers, rarely or frequently flooded with fresh water.

Lynchburg soils are moderately well to poorly drained soils, with loamy subsoil, on nearly level ridges and in shallow depressions.

Marlboro soils are well drained soils with a sandy or loamy surface layer and a loamy or clayey subsoil.

Noboco soils are well drained, sandy soils with a loamy or clayey subsoil.

Pantego soils are moderately well drained and well drained soils with a sandy surface layer and a loamy subsoil, and very poorly drained soils that are loamy throughout.

Paxville soils are somewhat to very poorly drained soils, with loamy subsoil, on low ridges and in depressions.

Rains soils are moderately well to poorly drained soils, with a loamy subsoil, on nearly level ridges and in shallow depressions.

Rutledge soils are somewhat poorly drained to moderately well drained, nearly level, sandy soils on ridges and poorly drained to very poorly drained, sandy soils in depressions.

Tawcaw soils are poorly drained to well drained soils that are clayey or loamy throughout and are subject to flooding.

Wagram soils are well drained to very poorly drained, depressional to nearly level and gently sloping soils with a loamy to sandy surface layer and a clayey to loamy subsoil.

Wahee soils are poorly drained soils on low, nearly level areas and low ridges.

Yauhannah soils are poorly drained to moderately well drained soils with a loamy subsoil, on nearly level ridges and in shallow depressions.

Yemassee soils are poorly drained to moderately well drained soils with a loamy subsoil, on nearly level ridges and in shallow depressions.

Slope and Erodibility

The definition of soil erodibility differs from that of soil erosion. Soil erosion may be more influenced by slope, rainstorm characteristics, cover, and land management than by soil properties. Soil erodibility refers to the properties of the soil itself, which cause it to erode more or less easily than others when all other factors are constant.

The soil erodibility factor, K, is the rate of soil loss per erosion index unit as measured on a unit plot, and represents an average value for a given soil reflecting the combined effects of all the soil properties that significantly influence the ease of soil erosion by rainfall and runoff if not protected. The K values closer to 1.0 represent higher soil erodibility and a greater need for best management practices to minimize erosion and contain those sediments which do erode. The range of K-factor values in the Santee River Basin is from 0.12 to 0.24.

Fish Consumption Advisory

At the time of publication, a fish consumption advisory issued by SCDHEC is in effect for **Lake Marion, the Rediversion Canal, the Santee River (from the Lake Marion dam to the South Santee River), South Santee River (from the Santee River to US Hwy 17/701 bridge), North Santee River (from the Santee River to US Hwy 17/701 bridge), and Wambaw Creek** advising people to limit the amount of some types of fish consumed from these waters. Fish consumption advisories are updated annually in March. For background information and the most current advisories please visit the Bureau of Water homepage at http://www.state.sc.us/dhec/eqc/water/ and click on "Advisories" under the Water Subject Index, or go directly to http://www.state.sc.us/dhec/eqc/admin/html/fishadv.html. For more information or a hard copy of the advisories, call SCDHEC's Division of Health Hazard Evaluation toll-free at (888) 849-7241.

Climate

Normal yearly rainfall in the Santee River Basin is 48.62 inches, according to the S.C. historic climatological record. Data compiled from National Weather Service stations in Rimini, Georgetown, and at the Pinopolis Dam were used to determine the general climate information for this portion of the State. The highest level of rainfall occurs in the summer with 17.24 inches; 9.98, 10.44, and 10.96 inches of rain falling in the fall, winter, and spring, respectively. The average annual daily temperature is 64.1°F. Summer temperatures average 79.2°F and fall, winter, and spring temperatures are 65.6°F, 47.8°F, and 63.7°F, respectively.

Watershed Evaluations

03050111-010

(Santee River/Lake Marion)

General Description

Watershed 03050111-010 is located in Sumter, Clarendon, Calhoun, Orangeburg, and Berkeley Counties and consists primarily of the ***Santee River*** and its tributaries that flow into Lake Marion. The watershed occupies 222,737 acres of the Upper and Lower Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Chastain-Cantey-Faceville-Goldsboro-Rains series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 2%, with a range of 0-6%. Land use/land cover in the watershed includes: 34.7% water, 26.8% forested land, 14.5% agricultural land, 12.5% scrub/shrub land, 9.9% forested wetland, 0.7% urban land, 0.6% nonforested wetland, and 0.3% barren land.

The Congaree River and the Wateree River join to form the headwaters of the Santee River. The Santee River flows through Lake Marion and exits through the Santee Dam or through the Diversio999n Canal to fill Lake Moultrie. Before entering the impounded Lake Marion, the Santee River receives drainage from Broadwater Creek and the Santee Swamp receives drainage from Tavern Creek and Mill Creek. Streams draining into Lake Marion include Squirrel Creek, Warley Creek, Spring Grove Creek (Pine Tree Creek, Ballard Creek, Half Way Creek, Duckford Branch), Richardson Branch, the Halfway Swamp Creek watershed (03050111-020), Little Poplar Creek, Big Poplar Creek, the Jacks Creek watershed (03050111-030), Cantey Bay (Oyster Bay, Monkey Bay), Chapel Branch, Webbs Creek, Mill Creek, Savana Branch, the Tawcaw Creek watershed (03050111-040), Eutaw Creek, and the Potato Creek watershed (03050111-050). Additional natural resources in the watershed include the Santee State Park, near Big Poplar Creek, and the Santee National Wildlife Refuge, which extends over the northern shoreline from Jacks Creek-Cantey Bay area to the Santee Dam. The South Carolina Public Service Authority (Santee Cooper) oversees the operation of the lake with uses that include power generation and numerous forms of recreation (hunting, fishing, boating, swimming). There are a total of 157.1 stream miles and 89,008.3 acres of lake waters in this watershed, all classified FW.

Water Quality

Station	Type	Class	Description
SC-056	SC	FW	DRAINAGE FROM SAFETY KLEEN SEDIMENTATION POND B
SC-057	SC	FW	DRAINAGE FROM SAFETY KLEEN SEDIMENTATION POND A
SC-058	SC	FW	STREAM OFFSITE, SAFETY KLEEN PINEWOOD
SC-005	SC	FW	LAKE MARION APPROX 0.9 MI NW OF RIMINI RR TRESTLE
SC-004	SC	FW	SANTEE RIVER 0.1 MI UPSTREAM OF BROADWATER CREEK
SC-008	SC	FW	SANTEE R. AT RIMINI RR TRESTLE 3.1 MI N OF LONE STAR
SC-009	SC	FW	SPRING GROVE CREEK AT S-14-26

SC-006	C	FW	WARLEY CREEK AT SC 267
SC-038	SC	FW	LAKE MARION AT MOUTH OF HALFWAY SWAMP CREEK
SC-039	SC	FW	LAKE MARION 1.25 MI SE OF RIMINI RR TRESTLE
SC-010	SC	FW	LAKE MARION AT CHANNEL MARKER 150
SC-044	SC	FW	LAKE MARION BETWEEN STUMPHOLE LANDING AND TREE LINE
SC-011	SC	FW	BIG POPLAR CREEK AT S-38-105
SC-012	SC	FW	LAKE MARION 0.6 MI SW OF JACKS CREEK EMBAYMENT
SC-045	SC	FW	UNNAMED STREAM FROM POND ON SANTEE NATL GOLF COURSE
SC-014	SC	FW	LAKE MARION AT HEADWATERS OF CHAPEL BR FLOODED CREEK
ST-025	P	FW	LAKE MARION AT OLD US 301/15 BRIDGE AT SANTEE
SC-015	SC	FW	LAKE MARION AT OLD US 301/15 BRIDGE AT SANTEE
SC-042	SC	FW	LAKE MARION 0.5 MI W OF I-95/US 301 BRIDGE
SC-040	SC	FW	LAKE MARION AT USFWS CHANNEL MARKER 79
SC-041	SC	FW	LAKE MARION 2 MI N OF USFWS CHANNEL MARKER 79
SC-016	SC	FW	LAKE MARION AT USFWS CHANNEL MARKER 69
SC-036	SC	FW	LAKE MARION O.4 MI S OF TAWCAW CREEK EMBAYMENT
SC-021	SC	FW	LAKE MARION 0.9 MI NE OF ROCKS POND CAMPGROUND
SC-022	SC	FW	LAKE MARION AT CHANNEL MARKER 44
ST-024	P	FW	LAKE MARION, POTATO CK EMBAY. AT CAMP BOB COOPER

Santee River **-** The SCPSA has two sampling locations along this section of the Santee River (**SC-004** and **SC-008**). Aquatic life and recreational uses are fully supported at both sites.

Lake Marion **-** Lake Marion has a watershed encompassing 14,540.3 km^2 (up to the Lake Murray, Parr Reservoir, and Lake Wateree dams), a surface area of 44,759.2 hectares, and a maximum and mean depth of 23.4m and 3.9m, respectively. Due to the shallow depth and high nutrient level of the lake, aquatic macrophytes have proliferated and public access has been restricted. Hydropower generation has been impaired by the plants as well as recreation. Treatment measures have included both aquatic herbicides and grass carp stocking since 1989 to the present. Stockings were at a rate of 25 fish/vegetated acre and 100,000 fish at a time, for a total of 400,000 fish from 1989 to 1992. No fish were stocked in Lake Marion in 1993, but 2,000 fish were introduced to Wyboo Creek and Potato Creek in 1994. Low Falls Landing, Wyboo Creek, Potato Creek, and Spiers Landing were stocked with a total of 22,000 grass carp in 1995, and Rocks Pond Landing was stocked with 23,000 fish in 1996. A total of 4,000 grass carp were stocked between the Potato Creek embayment and Dean Swamp in 1997, 750 fish in Fountain Lake in 1998, and no fish were stocked in Lake Marion in 1999. Aquatic herbicide continues to be applied to upper, mid, and lower lake regions to provide access to landings and fishing areas.

The South Carolina Public Service Authority - Santee Cooper (SCPSA) samples fourteen sites and SCDHEC samples one site on Lake Marion. Aquatic life and recreational uses are fully supported at all sites sampled by SCPSA. This is a blackwater system, characterized by naturally low pH and dissolved oxygen concentrations. Although pH excursions occurred at **SC-044**, and dissolved oxygen

excursions occurred at **SC-005** and **SC-039**, they were typical of values seen in blackwater systems and were considered natural, not standards violations.

Aquatic life uses are not supported at **ST-025**, sampled by SCDHEC, due to occurrences of copper in excess of the aquatic life acute standards, including a high concentration of copper measured in 1995. There was a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Although recreational uses are fully supported, there is a significant increasing trend in fecal coliform bacteria concentration at this site.

***Drainage From Safety Kleen Sedimentation Pond B (SC-056)* -** This site is sampled by the SCPSA. Aquatic life uses are not supported due to pH excursions. Recreational uses are fully supported.

***Drainage From Safety Kleen Sedimentation Pond A (SC-057)* -** This site is sampled by the SCPSA. Aquatic life and recreational uses are fully supported.

***Stream Offsite, Safety Kleen Pinewood (SC-058)* -** This site is sampled by the SCPSA. Aquatic life uses are not supported due to pH excursions. Recreational uses are fully supported.

***Spring Grove Creek (SC-009)* -** This site is sampled by the SCPSA. Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low pH conditions. Although pH excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Warley Creek (SC-006) - This site is sampled by the SCPSA. Aquatic life uses are fully supported. Recreational uses are partially supported due to fecal coliform bacteria excursions.

***Big Poplar Creek (SC-011)* -** This site is sampled by the SCPSA. Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low dissolved oxygen concentrations. Although dissolved oxygen excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are fully supported.

***Unnamed stream from pond on Santee National Golf Course (SC-045)* -** This site is sampled by the SCPSA. Aquatic life and recreational uses are fully supported.

***Chapel Branch (SC-014)* -** This site is sampled by the SCPSA. Aquatic life and recreational uses are fully supported.

Potato Creek Embayment of Lake Marion (ST-024) - Aquatic life uses are not supported due to occurrences of zinc in excess of the aquatic life acute standards, including a very high concentration measured in 1995. In addition, there was a significant decreasing trend in dissolved oxygen concentration and a significant increasing trend in turbidity. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are fully supported.

A fish consumption advisory has been issued by the Department for mercury and includes portions of Lake Marion within this watershed (see advisory p.34).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
LAKE MARION SAFETY-KLEEN, INC. (LAIDLAW ENVIR. SER.) PIPE #: 001 FLOW: 1.26 PIPE #: 002 FLOW: 0.61 PIPE #: 002A FLOW: 1.37	SC0042170 MINOR INDUSTRIAL EFFLUENT
PINE TREE CREEK TOWN OF PINEWOOD PIPE #: 001 FLOW: 0.134	SC0046868 MINOR DOMESTIC EFFLUENT
LAKE MARION HILLS/LABRUCE MINE PIPE #: 001 FLOW: M/R	SCG730026 MINOR INDUSTRIAL EFFLUENT
LAKE MARION TRIBUTARY MARTIN MARIETTA/BERKELEY QUARRY PIPE #: 001 FLOW: M/R	SCG730058 MINOR INDUSTRIAL EFFLUENT
BALLARD CREEK TOWN OF PINEWOOD WWTP PIPE #: 001 FLOW: 0.134 (PROPOSED)	SC0046868 MINOR DOMESTIC WQL FOR NH3-N, TRC

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE / ***RECEIVING STREAM***	***PERMIT #*** / ***STATUS***
SANTEE STATE PARK/RESIDENT LAKE MARION	38-305-0300 ACTIVE
BELLS WINTER PARK/FAMILY LAKE MARION	38-307-0401 ACTIVE

ROCKS POND CAMP GROUND/FAMILY LAKE MARION	38-307-0403 ACTIVE
RT BLOUNTS OVERNIGHT PARK/FAMILY LAKE MARION	38-307-0406 ACTIVE
LAKE MARION RESORT & MARINA/FAMILY LAKE MARION	38-307-0402 ACTIVE
MILL CREEK LANDING CAMPGROUND/FAMILY LAKE MARION	38-307-0410 ACTIVE
CYPRESS SHORES MARINA/FAMILY LAKE MARION	38-307-0411 ACTIVE
FERGUSON S CAMPGROUND/FAMILY LAKE MARION	38-307-0412 ACTIVE
POLLYS LANDING/FAMILY LAKE MARION	14-307-0009 ACTIVE
ELLIOTTS CAMPGROUND/FAMILY LAKE MARION	14-307-0010 ACTIVE
CAMP BOB COOPER/RESIDENT LAKE MARION	14-305-0001 ACTIVE
CAMP HARRY DANIELS/RESIDENT LAKE MARION	09-305-0001 ACTIVE

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
LAIDLAW ENVIR. SERVICES MINGO MINE #1	0416-85 FULLERS EARTH
LAIDLAW ENVIR. SERVICES MINGO MINE #4	0712-27 CLAY
SAFETY-KLEEN HILLS-LABRUCE	1014-27 CLAY
BLUE CIRCLE MCCURRY PIT	1069-17 CLAY

Land Disposal Activities

Landfill Facilities

LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
JF CLECKLEY & CO./PLT #4 INDUSTRIAL	IWP-025, IWP-023 ---------

JF CLECKLEY & CO./PLT #6	IWP-060
INDUSTRIAL	---------
LAIDLAW ENVIR. SERVICES	IWP-145
HAZARDOUS WASTE	ACTIVE

Land Application Sites

LAND APPLICATION SYSTEM FACILITY NAME	*ND# TYPE*
SPRAYFIELD TOWN OF ELLOREE	ND0067628 DOMESTIC
TILEFIELD LAKE MARION RES. & MARINA	ND0067610 DOMESTIC
SPRAY ON GOLF COURSE SANTEE PSD	ND0065676 DOMESTIC
SPRAYFIELD SANTEE RESORT HOTEL	ND0067652 DOMESTIC
TILEFIELD SANTEE LAKES CAMPGROUND	ND0067326 DOMESTIC
SPRAYFIELD CYPRESS POINT	ND0062227 DOMESTIC
SPRAYFIELD SCDPRT/SANTEE ST PK COTTAGES	ND0067920 DOMESTIC

Growth Potential

There is a moderate potential for growth in this watershed due primarily to the Lake Marion related factors of fishery tourism, new lakeside subdivisions, marinas, landings, and camping facilities. There is also a potential for residential, commercial, and industrial growth around the interchanges of I-95 at the Town of Santee and with U.S. Hwy. 301 and U.S. Hwy. 15. Some growth is expected around the Town of Pinewood, where the hazardous waste landfill is located.

03050111-020

(Halfway Swamp Creek)

General Description

Watershed 03050111-020 is located in Calhoun County and consists primarily of ***Halfway Swamp Creek*** and its tributaries. The watershed occupies 45,964 acres of the Upper Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Wagram-Faceville-Marlboro-Noboco series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 2%, with a range of 0-6%. Land use/land cover in the watershed includes: 46.3% forested land, 28.6% agricultural land, 11.8% forested wetland, 7.8% scrub/shrub land, 3.4% urban land, 1.2% barren land, and 0.9% water.

Halfway Swamp Creek originates near the Town of St. Matthews and drains into the upper reaches of Lake Marion. Before entering Lake Marion, Halfway Swamp Creek receives drainage from Lake Inspiration (35 acres) located in downtown St. Matthews, Furlick Branch, Lyons Creek (Antley Springs Branch, Bell Branch), and Hutto Pond (40 acres). There are numerous small lakes and ponds in this watershed (totaling 400 acres) and a total of 55.7 stream miles, all classified FW.

Water Quality

Station #	Type	Class	Description
C-058	S	FW	LAKE INSPIRATION - ST MATTHEWS (FRONT OF HEALTH DEPT)
C-063	S	FW	HALFWAY SWAMP CREEK AT S-09-43 3 MI E OF ST MATTHEWS
SC-007	SC	FW	HALFWAY SWAMP CREEK AT SC 33
CW-241	W	FW	HALFWAY SWAMP CREEK AT S-09-72
CW-242	W	FW	HALFWAY SWAMP CREEK TRIBUTARY AT S-09-158

Halfway Swamp Creek -There are two SCDHEC ambient monitoring network sites ***(C-063, CW-241)*** and one SCPSA monitoring site ***(SC-007)*** along Halfway Swamp Creek. Recreational uses are not supported at any site due to fecal coliform bacteria excursions. Aquatic life uses are fully supported at the furthest upstream site ***(C-063)***, and a significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. There is a significant decreasing trend in pH. Aquatic life uses are fully supported at ***SC-007***. At ***CW-241***, aquatic life uses are fully supported; however there was a high concentration of zinc measured in 1998.

Halfway Swamp Creek Tributary (CW-242) - Although a pH excursion occurred, due to the small number of samples, aquatic life use support determination is inconclusive. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Lake Inspiration (C-058) - Aquatic life uses are partially supported due to dissolved oxygen and pH excursions, compounded by a significant decreasing trend in dissolved oxygen concentration. There was

a significant decreasing trend in pH. Recreational uses are partially supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

A fish consumption advisory has been issued by the Department for mercury and includes portions of Lake Marion within this watershed (see advisory p.34).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION (EL/WQL)***
COMMENT	
ANTLEY SPRINGS	SC0028801
TOWN OF ST MATTHEWS/SOUTH PLANT	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.55	WATER QUALITY
WQL FOR NH3-N, TRC, DO	

Growth Potential

There is a low potential for growth in this watershed, with the exception of the northwestern corner around the Town of St. Matthews.

03050111-030

(Jacks Creek)

General Description

Watershed 03050111-030 is located in Clarendon County and consists primarily of ***Jacks Creek*** and its tributaries. The watershed occupies 24,269 acres of the Upper Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Faceville-Marlboro-Noboco-Bonneau-Cantey series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 5%, with a range of 0-10%. Land use/land cover in the watershed includes: 42.6% agricultural land, 31.8% forested land, 21.9% scrub/shrub land, 2.2% forested wetland, and 1.5% water.

Jacks Creek accepts drainage from Belser Creek (Chapel Creek), Sullivans Branch, and Big Branch (Spring Branch) before flowing into Lake Marion. There are several recreational ponds (totaling 426.1 acres) in this watershed and a total of 43.1 stream miles, all classified FW. The Santee National Wildlife Refuge is an additional natural resource in the watershed.

Water Quality

Station #	Type	Class	Description
CW-243	W	FW	BIG BRANCH AT S-14-41
CW-244	W	FW	JACKS CREEK AT S-14-76
SC-013	SC	FW	JACKS CREEK AT S-14-76

Jacks Creek **-** The Jacks Creek site is sampled by both SCDHEC **(CW-244)** and SCPSA **(SC-013)**. Aquatic life uses are fully supported, although a very high concentration of lead was measured in 1995 by SCDHEC. Recreational uses are partially supported due to fecal coliform bacteria excursions in the SCDHEC samples.

Big Branch (CW-243) - Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low pH and dissolved oxygen concentrations. Although pH and dissolved oxygen excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are partially supported due to fecal coliform bacteria excursions.

A fish consumption advisory has been issued by the Department for mercury and includes portions of Lake Marion within this watershed (see advisory p.34).

Nonpoint Source Management Program

Mining Activities

MINING COMPANY	***PERMIT #***
MINE NAME	***MINERAL***

Growth Potential

There is a low potential for growth in this watershed. There is a small portion of lakeshore, but the lack of water or sewer services in the area will limit significant growth.

03050111-040

(Tawcaw Creek)

General Description

Watershed 03050111-040 is located in Clarendon County and consists primarily of ***Tawcaw Creek*** and its tributaries. The watershed occupies 26,471 acres of the Upper Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Noboco-Bonneau-Cantey-Paxville series. The erodibility of the soil (K) averages 0.17; the slope of the terrain averages 3%, with a range of 0-10%. Land use/land cover in the watershed includes: 31.9% forested land, 30.2% agricultural land, 25.5% scrub/shrub land, 7.6% water, 4.7% forested wetland, 0.2% urban land, and 0.1% nonforested wetland.

Tawcaw Creek accepts the drainage from Little Tawcaw Creek and Penn Branch before flowing into Lake Marion. There are a total of 55.1 stream miles and 1,785.1 acres of lake waters in this watershed, all classified FW. The Santee National Wildlife Refuge is an additional natural resource in the watershed.

Water Quality

Station #	Type	Class	Description
ST-018	S	FW	TAWCAW CREEK AT S-14-127 3.2 MI S OF SUMMERTON
SC-018	SC	FW	TAWCAW CREEK AT S-14-127 3.2 MI S OF SUMMERTON
SC-017	SC	FW	LAKE MARION, MIDSTREAM OF TAWCAW EMBAYMENT

Tawcaw Creek **-** The Tawcaw Creek site is sampled by both SCDHEC **(ST-018)** and SCPSA **(SC-018)**. Aquatic life uses are not supported based on dissolved oxygen excursions in the SCDHEC samples. There is also a significant increasing trend in total phosphorus concentration. Recreational uses are not supported due to fecal coliform bacteria excursions.

Tawcaw Creek Arm of Lake Marion (SC-017) **-** Aquatic macrophytes have proliferated and public access has been restricted in Taw Caw Creek due to shallow depth and high nutrient levels. To abate aquatic plant growth in this area of the lake, aquatic herbicides have been applied several times since 1989. In addition, the waterbody was stocked with grass carp in 1994 and 1995. This site is sampled by SCPSA. Aquatic life uses are fully supported; however, elevated nutrient concentrations indicate the potential for adverse impacts to aquatic life due to eutrophication. Recreational uses are fully supported.

A fish consumption advisory has been issued by the Department for mercury and includes portions of Lake Marion within this watershed (see advisory p.34).

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE *RECEIVING STREAM*	*PERMIT #* *STATUS*
TAWCAW CREEK PARK/FAMILY LAKE MARION	14-307-0005 ACTIVE

Land Disposal Activities

Landfill Facilities

LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
OLD SUMMERTON LANDFILL --------	------ CLOSED

Land Application Sites

LAND APPLICATION SYSTEM *FACILITY NAME*	*PERMIT #* *TYPE*
SPRAYFIELD TOWN OF SUMMERTON	ND0063401 DOMESTIC
SPRAYFIELD GOAT ISLAND RESORT	ND0067318 DOMESTIC
AERATED TRT LAGOON SIGFIELD/FOXBORO GOLF COURSE	ND0066117 DOMESTIC

Growth Potential

There is a low to moderate potential for growth in this watershed, which includes a small portion of lakeshore.

03050111-050

(Potato Creek)

General Description

Watershed 03050111-050 is located in Clarendon County and consists primarily of ***Potato Creek*** and its tributaries. The watershed occupies 31,656 acres of the Upper Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Noboco-Bonneau-Paxville-Rutledge series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 2%, with a range of 0-10%. Land use/land cover in the watershed includes: 36.0% forested land, 27.7% scrub/shrub land, 21.7% agricultural land, 7.8% forested wetland, 6.5% water, and 0.3% nonforested wetland.

Potato Creek accepts the drainage of Wyboo Swamp, Church Branch, and Big Branch as it forms an arm of Lake Marion. Wyboo Swamp is formed from the drainage of Dean Swamp, Buckhead Branch, McCoys Branch, Rooty Branch, Bluff Branch, White Oak Branch (Three Hole Swamp), Birch Branch, White Oak Creek, Lizzies Branch (Clubhouse Branch) and Carroll Slough. There are a total of 62.3 stream miles and 1,719.8 acres of lake waters in this watershed, all classified FW. The Santee National Wildlife Refuge extends over a large portion of the watershed.

Water Quality

Station #	Type	Class	Description
SC-020	SC	FW	POTATO CREEK AT S-14-127
SC-019	SC	FW	LAKE MARION, MIDSTREAM OF POTATO CREEK EMBAYMENT
SC-023	SC	FW	LAKE MARION, MIDSTREAM OF WYBOO CREEK EMBAYMENT
SC-035	SC	FW	LAKE MARION AT MOUTH OF WYBOO CREEK

Potato Creek Embayment **-** Aquatic macrophytes have proliferated and public access has been restricted in Potato Creek due to shallow depth and high nutrient levels. To abate aquatic plant growth in this area of the lake, aquatic herbicides have been applied several times since 1989. In addition, the waterbody was stocked with grass carp in 1994, 1995, and 1997.

There are two sites sampled by the SCPSA along Potato Creek. Aquatic life and recreational uses are fully supported at ***SC-019***. Aquatic life uses are also fully supported at ***SC-020***. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Wyboo Creek - Aquatic macrophytes have proliferated and public access has been restricted in Wyboo Creek due to shallow depth and high nutrient levels. To abate aquatic plant growth in this area of the lake, aquatic herbicides have been applied several times since 1989. In addition, the waterbody was stocked with grass carp in 1994 and 1995.

Wyboo Creek is sampled at two locations by SCPSA. Recreational uses are fully supported at both sites. At the upstream site **(SC-023)**, aquatic life uses are fully supported; however, elevated

nutrient concentrations indicate the potential for adverse impacts to aquatic life due to eutrophication. Aquatic life uses are fully supported at the downstream site **(SC-035)**.
A fish consumption advisory has been issued by the Department for mercury and includes portions of Lake Marion within this watershed (see advisory p.34).

Nonpoint Source Management Program

Land Disposal Activities

Land Application Sites

LAND APPLICATION SYSTEM FACILITY NAME	*PERMIT # TYPE*
SPRAY ON GOLF COURSE	ND0072427
WYBOO PLANTATION/PHASE II	DOMESTIC

Growth Potential

There is a moderate potential for continued residential and commercial development along this section of lakeshore, which includes several new subdivisions and golf courses. The watershed also contains the Clarendon County Airport.

03050112-010

(Santee River)

General Description

Watershed 03050112-010 is located in Clarendon, Williamsburg, and Berkeley Counties and consists primarily of the ***Santee River*** and its tributaries downstream of Lake Marion to Crawl Creek (rediversion canal). The watershed occupies 120,589 acres of the Upper and Lower Coastal Plain regions of South Carolina. The predominant soil types consist of an association of the Chastain-Tawcaw-Lynchburg-Emporia series. The erodibility of the soil (K) averages 0.24; the slope of the terrain averages 2%, with a range of 0-6%. Land use/land cover in the watershed includes: 40.0% forested land, 33.3% forested wetland, 13.2% agricultural land, 12.2% scrub/shrub land, 0.9% water, and 0.4% barren land.

This segment of the Santee River flows out of the Santee Dam of Lake Marion and incorporates the drainage of the Little River, the Dead River, Highland Creek (Hicks Branch, Meetinghouse Branch, Bennetts Branch), Doctors Branch (Torkiln Branch, Mill Branch), Mt. Hope Swamp (Hagan Branch, Long Branch, Junkyard Bay, Guise Bay, Little Junkyard Bay, Cypress Bay), Campbell Branch, Walnut Branch, and Johns Run. There are numerous ponds and oxbow lakes used for recreation and water supply (totaling 444.7 acres) and a total of 178.3 stream miles, all classified FW. The oxbow lakes include Couturier Lake, Cordes Lake, Solomon Lake, Little Solomon Lake, Wood Lake, and Maham Lake.

Water Quality

Station #	Type	Class	Description
SC-024	SC	FW	SANTEE RIVER AT WILSONS LANDING
ST-016	P	FW	SANTEE RIVER AT US 52 6.5 MI NNW OF ST STEPHENS

***Santee River* -** There is one SCDHEC **(ST-016)** and one SCPSA **(SC-024)** monitoring site along this section of the Santee River. Recreational uses are fully supported at both sites. At the upstream site **(SC-024)**, aquatic life uses are fully supported. Aquatic life uses are also fully supported at **ST-016,** although there is a significant increasing trend in turbidity. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. A very high concentration of copper was detected in the 1994 sediment sample, very high concentrations of lead were detected in the 1994 and 1997 samples, and endrin was detected in the 1995 sample.

A fish consumption advisory has been issued by the Department for mercury and includes the Santee River within this watershed (see advisory p.34).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
SANTEE RIVER SANTEE RIVER WWTP WILLIAMSBURG CO. W&SA PIPE #: 001 FLOW: 0.50 PROPOSED	SC0048097 MINOR DOMESTIC EFFLUENT

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
SANTEE MINERALS, INC. GREGG MINE	0465-15 SAND

Growth Potential

There is a low potential for growth projected in this watershed, which is occupied largely by the Santee National Wildlife Refuge.

03050112-020

(Rediversion Canal)

General Description

Watershed 03050112-020 extends through Berkeley County and consists primarily of the ***Rediversion Canal (Crawl Creek)*** and its tributaries. The watershed occupies 23,419 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Chastain-Tawcaw-Pantego-Noboco-Bonneau series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 2%, with a range of 0-6%. Land use/land cover in the watershed includes: 30.9% forested land, 21.0% scrub/shrub land, 18.6% forested wetland, 14.3% agricultural land, 6.8% water, 4.5% barren land, and 3.9% urban land.

The 11.5 mile Rediversion Canal connects Lake Moultrie with the lower Santee River near the Town of St. Stephen. Mattassee Lake accepts drainage from Crawl Creek (Lifeland Branch, Big Bay Branch) and Curriboo Branch before entering the Rediversion Canal. Also draining into the canal are Ponteaux Branch and Mattassee Branch. There are a total of 41.3 stream miles in this watershed, all classified FW. An additional natural resource is the Francis Marion National Forest, which extends over the base of the watershed.

Water Quality

Station #	Type	Class	Description
SC-037	SC	FW	REDIVERSION CANAL AT SC 45
ST-031	P	FW	REDIVERSION CANAL AT US 52

Rediversion Canal - There is one SCDHEC site **(ST-031)** and one SCPSA site **(SC-037)** along the Rediversion Canal. Aquatic life and recreational uses are fully supported at both sites. At **ST-031,** there was a significant decreasing trend in dissolved oxygen concentration, a significant increasing trend in turbidity, and a significant increasing trend in pH.

A fish consumption advisory has been issued by the Department for mercury and includes the Rediversion Canal within this watershed (see advisory p.34).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION***
COMMENT	
REDIVERSION CANAL	SC0047937
CORPS. OF ENG./ST. STEPHEN HYDRO	MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R	EFFLUENT

REDIVERSION CANAL GEORGIA PACIFIC RESINS PIPE #: 001 FLOW: M/R	SCG250181 MINOR INDUSTRIAL EFFLUENT
REDIVERSION CANAL GEORGIA PACIFIC CORP. PIPE #: 001 FLOW: M/R	SCG250179 MINOR INDUSTRIAL EFFLUENT
CURRIBOO BRANCH ALBANY INTNL/FELT DIV. PIPE #: 001 FLOW: M/R PIPE #: 002 FLOW: M/R PIPE #: 003 FLOW: M/R	SC0002569 MINOR INDUSTRIAL WQL FOR NH3-N, TRC, DO WQL FOR BOD_5, NH3-N

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
DAVID & RALPH WOODWARD OLD FIELD MINE	0929-15 SAND/CLAY

Land Disposal Activities

Landfill Facilities

LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
GEORGIA PACIFIC CORP. CHEM. INDUSTRIAL	083304-1601 (IWP-078, CWP-026) ACTIVE

Growth Potential

There is a low to moderate potential for growth in this watershed, which contains the Town of St. Stephen and portions of the communities of Pineville and Russellville. The Town of St. Stephen has both water and sewer services available, which may aid in attracting development to the area. Another source of potential growth is U.S. Hwy. 52, which is scheduled to be widened to four lanes.

03050112-030

(Santee River)

General Description

Watershed 03050112-030 is located in Williamsburg, Berkeley, and Georgetown Counties and consists primarily of the ***Santee River*** and its tributaries from the Rediversion Canal to Wadmacon Creek. The watershed occupies 136,914 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. The predominant soil types consist of an association of the Chastain-Bladen-Wahee-Tawcaw-Hobcaw series. The erodibility of the soil (K) averages 0.17; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 57.5% forested land, 26.5% forested wetland, 8.7% scrub/shrub land, 4.2% agricultural land, 1.5% nonforested wetland, 1.2% water, 0.3% barren land, and 0.1% urban land.

This lowest segment of the Santee River accepts the upstream river segment drainage (03050112-010), together with Wedboo Creek (Meeting House Branch, Beauford Branch), Savanna Creek, Byno Creek, Wittee Lake (June Branch), Wittee Branch (Mill Creek), and Ferry Lake. Further downstream, Dutart Creek, Echaw Creek (Bark Island Slough, Beaman Branch, Bay Branch, Pole Branch, June Pond), and Put-on Branch (Buck Branch) enter the river. Hell Hole Bay extends across the watershed near the headwaters of Dutart and Savanna Creeks. Velvet Branch and Red Bluff Creek flow into the river at the base of the watershed. There are a total of 179.1 stream miles in this watershed and several ponds and lakes (totaling 148.7 acres), all classified FW. Additional natural resources include the Francis Marion National Forest, the Hell Hole Bay Wilderness Area, and the Guilliard Lake Scenic Area.

Water Quality

Station #	Type	Class	Description
ST-001	P	FW	SANTEE RIVER AT SC 41/US 17A NE OF JAMESTOWN

Santee River (ST-001) - Aquatic life uses are fully supported; however there is a significant decreasing trend in dissolved oxygen concentration. This is a tidally influenced river with significant swamp drainage characterized by naturally low dissolved oxygen concentrations. Although dissolved oxygen excursions occurred, they were typical of such systems and were considered natural, not standards violations. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. In sediments, a very high concentration of lead and a high concentration of zinc were detected in the 1994 sample, together with the detection of di-n-butylphthalate in the 1995 sample and bis(2-ethylhexyl)phthalate in the 1997 sample. Recreational uses are fully supported.

A fish consumption advisory has been issued by the Department for mercury and includes the Santee River within this watershed (see advisory p.34).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
SANTEE RIVER TOWN OF ST STEPHEN PIPE #: 001 FLOW: 0.9	SC0025259 MINOR DOMESTIC EFFLUENT
SANTEE RIVER PROUVOST USA , INC. PIPE #: 001 FLOW: M/R	SC0000990 MAJOR INDUSTRIAL EFFLUENT
DUTART CREEK MARTIN MARIETTA GEORGETOWN II (SOUTHERN AGGR.) PIPE #: 001 FLOW: 10.8	SCG730059 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
MARTIN MARIETTA (SOUTHERN AGGREGATES) JAMESTOWN QUARRY	0885-15 LIMESTONE
MARTIN MARIETTA AGGREGATES GEORGETOWN QUARRY	0103-43 LIMESTONE

Growth Potential

There is a low potential for growth in this watershed, which contains the Town of Jamestown and the communities of Alvin, Honey Hill, and Shulerville. Jamestown provides water, but there is no sewer service. The majority of the watershed extends over wetland (bays and swamps) areas.

03050112-040

(Wadmacon Creek)

General Description

Watershed 03050112-040 is located in Georgetown and Williamsburg Counties and consists primarily of ***Wadmacon Creek*** and its tributaries. The watershed occupies 42,919 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. The predominant soil types consist of an association of the Bladen-Wahee-Levy-Chastain series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 54.5% forested land, 18.9% scrub/shrub land, 15.4% forested wetland, 8.7% nonforested wetland, 1.4% agricultural land, 0.9% barren land, 0.1% urban land, and 0.1% water.

Wadmacon Creek flows through Dawhoo Lake and receives drainage from Cedar Creek (Long Branch, Brunson Branch) before flowing into the South Santee River watershed. The Cutoff connects Wadmacon Creek and the Santee River watershed (03050112-030). There are a total of 48.6 stream miles in this watershed and a few lakes and ponds (totaling 59.7 acres), all classified FW.

Water Quality

No monitoring occurred in this watershed.

Growth Potential

There is a low potential for growth in this watershed.

03050112-050

(Wambaw Creek)

General Description

Watershed 03050112-050 is located in Berkeley and Charleston Counties and consists primarily of ***Wambaw Creek*** and its tributaries. The watershed occupies 63,673 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. The predominant soil types consist of an association of the Chipley-Yauhannah-Yemassee-Leon series. The erodibility of the soil (K) averages 0.12; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 80.7% forested land, 13.6% forested wetland, 4.3% scrub/shrub land, 1.3% nonforested wetland, and 0.1% barren land.

Wambaw Creek accepts drainage from Wambaw Swamp, Mechaw Creek, Mill Branch, and Cane Branch (Keepers Branch). Little Wambaw Swamp connects Wambaw Swamp and Mechaw Creek. Further downstream, Big Morgan Branch (Little Morgan Branch) enters Wambaw Creek and flows into the South Santee River watershed (03050112-060). Cedar Creek drains into Wambaw Creek at the base of the watershed and flows into the North Santee River watershed (03050112-060). There are ponds totaling 3.8 acres, 8.8 acres of estuarine areas, and a total of 61.2 stream miles in this watershed, all classified FW. An additional natural resource is the Francis Marion National Forest, which extends across the entire watershed. Located within the National Forest is the Wambaw Creek National Wilderness Area, the Wambaw Swamp National Wilderness Area, and the proposed Waterhorn Historic Area.

Water Quality

Station #	Type	Class	Description
CSTL-112	W	FW	WAMBAW CREEK AT EXT. OF S-10-857

Wambaw Creek (CSTL-112) - Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low dissolved oxygen. Although dissolved oxygen excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are fully supported.

A fish consumption advisory has been issued by the Department for mercury and includes Wambaw Creek within this watershed (see advisory p.34).

Growth Potential

There is a low potential for growth projected for this watershed.

03050112-060

(North Santee River/South Santee River)

General Description

Watershed 03050112-060 is located in Charleston County and consists primarily of the ***South Santee River and the North Santee River*** and their tributaries. The watershed occupies 79,763 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Capers-Chipley series. The erodibility of the soil (K) averages 0.19; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 38.3% forested land, 36.6% nonforested wetland, 11.3% water, 8.4% scrub/shrub land, 5.0% forested wetland, 0.3% barren land, and 0.1% agricultural land.

The lower Santee River divides into the South Santee River and the North Santee River, both draining into the Atlantic Ocean. Both the South and North Santee Rivers are classified FW from their origin to the U.S. Hwy. 17 crossing, SA from the U.S. Hwy. 17 crossing to 1000 feet below the Atlantic Intracoastal Waterway (AIWW) crossing, and ORW from 1000 feet below the AIWW crossing to the Atlantic Ocean. There are a total of 54.6 stream miles in this watershed, along with 657.1 acres of lake waters and 5,266.6 acres of estuarine areas. The South Santee River accepts drainage from Chicken Creek, Hampton Creek, Montgomery Creek, Garfish Creek, Sixmile Creek, and Collins Creek. Pleasant Creek connects Sixmile Creek to the South Santee River. The Fourmile Creek Canal and Alligator Creek also drain into the South Santee River. Sall Creek drains directly into the AIWW, which bisects the South and North Santee Rivers. This section of the AIWW is classified SFH.

The North Santee River accepts drainage from Cedar Creek, Pole Branch, Bonny Clabber Creek, White Oak Creek, and Sixmile Creek. Minim Creek drains into the North Santee River and into the North Santee Bay, and incorporates the drainage of Kinloch Creek (Bluff Creek), Pleasant Meadow Creek, Bella Creek, and Cork Creek. Atchison Creek and Fourmile Creek Canal drain directly into the river, and Little Duck Creek, Duck Creek, Big Duck Creek, Mosquito Creek, and Beach Creek drain into the North Santee Bay. Cane Creek connects the North Santee River to the North Santee Bay and Bird Bank Creek enters the river just before it flows into the Atlantic Ocean.

Additional natural resources in the watershed include the Francis Marion National Forest (covering the southeastern portion of the watershed), several wildlife management areas, the Yawkey Center, Hampton Plantation State Park, and numerous historic structures.

Water Quality

Station #	Type	Class	Description
ST-005	S	FW/SA	NORTH SANTEE RIVER AT US 17
ST-006	P	FW/SA	SOUTH SANTEE RIVER AT US 17

North Santee River (ST-005) - Aquatic life is fully supported. This site is located in a transition area between fresh and salt waters and shows characteristics of both. Significant decreasing trends in

five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are fully supported.

South Santee River (ST-006) - Aquatic life use is fully supported. This site is located in a transition area between fresh and salt waters and shows characteristics of both. Although there were violations of the Class FW chromium standards, they did not constitute violations of the Class SA standards. There is a significant decreasing trend in dissolved oxygen concentration. A high concentration of zinc was detected in the 1995 sediment sample. Significant decreasing trends in five-day biochemical oxygen demand, total nitrogen concentrations, and turbidity suggest improving conditions for these parameters. Recreational uses are fully supported.

A fish consumption advisory has been issued by the Department for mercury and includes the North and South Santee Rivers within this watershed (see advisory p.34).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION (EL/WQL)***
COMMENT	
NORTH SANTEE RIVER	SC0042439
GCW&SA NORTH SANTEE WWTP	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.052	EFFLUENT
NORTH SANTEE RIVER	SC0022471
SCPSA/WINYAH STEAM	MAJOR INDUSTRIAL
PIPE #: 001 FLOW: 5.76 (PROPOSED)	EFFLUENT

Growth Potential

There is a low potential for growth in this watershed.

Cooper River/Ashley River Basin Description

The ***Cooper River Basin*** encompasses 8 watersheds and 843 square miles. The Cooper River Basin incorporates the Lower Coastal Plain and Coastal Zone regions. Of the half a million acres in the Cooper River Basin, 52.7% is forested land, 15.8% is water, 14.5% is forested wetland, 8.3% is urban land, 4.1% is scrub/shrub land, 2.6% is agricultural land, 1.6% is nonforested wetland, and 0.4% is barren land. The urban land is comprised chiefly of the greater City of Charleston area. There are a total of 471.2 stream miles in the Cooper River Basin, together with 60,188.5 acres of lake waters, and 13,059.3 acres of estuarine areas. The diverted Santee River flows through Lake Moultrie's Pinopolis Dam and joins Wadboo Creek to form the Cooper River. The Cooper River merges with Mepkin Creek to form the West Branch Cooper River, which then converges with the East Branch Cooper River to reform the Cooper River. The Cooper River then accepts drainage from the Back River, Goose Creek, and the Wando River before flowing into the Charleston Harbor and the Atlantic Ocean.

The ***Ashley River Basin*** incorporates 7 watersheds and 894 square miles. The Ashley River Basin consists of the Lower Coastal Plain and Coastal Zone regions of the State, and of the half a million acres in the basin, 47.6% is forested land, 15.1% is nonforested wetland, 9.8% is urban land, 9.0% is water, 7.8% is forested wetland, 7.3% is scrub/shrub land, 3.1% is agricultural land, and 0.3% is barren land. The urban land is comprised chiefly of the greater City of Charleston area. There are a total of 239.6 stream miles in the Ashley River Basin, together with 4,232.0 acres of lake waters, and 32,701.9 acres of estuarine areas. The Cypress Swamp drains into the Great Cypress Swamp, which joins with Hurricane Branch to form the Ashley River. The Ashley River accepts drainage from several streams including Dorchester Creek, and communicates with the Stono River by way of Elliot Cut before draining into the Charleston Harbor and the Atlantic Ocean. The Charleston Harbor also accepts drainage from a portion of the Atlantic Intracoastal Waterway (AIWW).

Physiographic Regions

The State of South Carolina has been divided into six Major Land Resource Areas (MLRAs) by the USDA Soil Conservation Service. The MLRAs are physiographic regions that have soils, climate, water resources and land uses in common. The physiographic regions that define the Cooper River/Ashley River Basin are as follows.

The **Lower Coastal Plain** is an area that is most nearly level and is dissected by many broad, shallow valleys with meandering stream channels; elevations range from 25 to 125 feet.

The **Coastal Zone** is a mostly tidally-influenced area that is nearly level and dissected by many broad, shallow valleys with meandering stream channels; most of the valleys terminate in tidal estuaries along the coast; elevations range from sea level to about 25 feet.

Land Use/Land Cover

General land use/land cover data for South Carolina was derived from SCDNR 1990 SPOT multispectral satellite images using image mapping software to inventory the State's land classifications, which are as follows.

Urban land is characterized by man-made structures and artificial surfaces related to industrial, commercial and residential uses, as well as vegetated portions of urban areas.

Agricultural/Grass land is characterized by cropland, pasture and orchards, and may include some grass cover in Urban, Scrub/Shrub and Forest areas.

Scrub/Shrub land is adapted from the western Rangeland classification to represent the "fallow" condition of the land (currently unused, yet vegetated), and is most commonly found in the dry Sandhills region including areas of farmland, sparse pines, regenerating forest lands and recently harvested timber lands.

Forest land is characterized by deciduous and evergreen trees not including forests in wetland settings.

Forested Wetland (swampland) is the saturated bottomland, mostly hardwood forests that are primarily composed of wooded swamps occupying river floodplains and isolated low-lying wet areas, primarily located in the Coastal Plain.

Nonforested Wetland (marshland) is dependent on soil moisture to distinguish it from Scrub/Shrub since both classes contain grasses and low herbaceous cover; nonforested wetlands are most common along the coast and isolated freshwater areas found in the Coastal Plain.

Barren land is characterized by an unvegetated condition of the land, both natural (rock, beaches and unvegetated flats) and man-induced (rock quarries, mines and areas cleared for construction in urban areas or clearcut forest areas).

Water (non-land) includes both fresh and tidal waters.

Soil Types

The dominant soil associations, or those soil series comprising, together, over 40% of the land area, were recorded for each watershed in percent descending order. The watersheds all contained up to 6-24 additional soil series not listed that made up the remaining land area percentage. The individual soil series for the Cooper River/Ashley River Basin are described as follows.

Bladen soils are poorly drained soils on low, nearly level areas and low ridges.

Bohicket soils are very poorly drained soils, clayey throughout or mucky and underlain with clayey layers, frequently flooded.

Brookman soils are somewhat poorly drained to very poorly drained soils with a loamy surface layer and a loamy and clayey subsoil.

Capers soils are very poorly drained soils, clayey throughout or mucky, and underlain with clayey layers, frequently flooded.

Chipley soils are moderately to excessively well drained soils, sandy throughout, on high ridges.

Chisolm soils are deep, well to moderately drained soils with sandy to loamy subsoil on nearly level to gently sloping terrain.

Daleville soils are nearly level, poorly drained soils, with silty loam in slight depressions and drainage ways on upland terraces.

Foxworth soils are well drained, sandy marine sediment derived, with acidic soils.

Hobcaw soils are nearly level, very poorly drained soils in depressions.

Jedburg soils moderately well drained to poorly drained soils with a loamy surface layer and a thick, loamy subsoil that has a high silt content.

Kiawah soils are deep, somewhat poorly drained to poorly drained, acidic soils, sandy throughout, with a surface soil and subsoil of loamy fine sand.

Leon soils are somewhat poorly drained to poorly drained, level to nearly level, sandy soils with weakly cemented layers stained by organic matter.

Lynchburg soils are moderately well to poorly drained soils, with loamy subsoil, on nearly level ridges and in shallow depressions.

Meggett soils are poorly drained to very poorly drained, level to nearly level soils with a loamy to sandy surface layer and a loamy to clayey subsoil.

Mouzon soils are poorly drained, loamy and sandy soils with a loamy subsoil.

Rains soils are moderately well to poorly drained soils, with a loamy subsoil, on nearly level ridges and in shallow depressions.

Udipsamments soils are excessively drained, gently sloping to moderately steep, sandy soils that occur on long, narrow ridges.

Udorthents soils are mostly well drained soils forming in heterogeneous material from excavation or construction soil or refuse, or loamy, dredged material pumped onto low-lying marshy areas.

Wahee soils are poorly drained soils on low, nearly level areas and low ridges.

Yauhannah soils are poorly drained to moderately well drained soils with a loamy subsoil, on nearly level ridges and in shallow depressions.

Yemassee soils are poorly drained to moderately well drained soils with a loamy subsoil, on nearly level ridges and in shallow depressions.

Yonges soils are moderately well drained to poorly drained, nearly level soils with a sandy surface layer and a predominantly loamy subsoil.

Slope and Erodibility

The definition of soil erodibility differs from that of soil erosion. Soil erosion may be more influenced by slope, rainstorm characteristics, cover, and land management than by soil properties. Soil erodibility refers to the properties of the soil itself, which cause it to erode more or less easily than others when all other factors are constant.

The soil erodibility factor, K, is the rate of soil loss per erosion index unit as measured on a unit plot, and represents an average value for a given soil reflecting the combined effects of all the soil properties that significantly influence the ease of soil erosion by rainfall and runoff if not protected. The K values closer to 1.0 represent higher soil erodibility and a greater need for best management practices to minimize erosion and contain those sediments which do erode. The range of K-factor values in the Cooper River/Ashley River Basin is from 0.12 to 0.28, among the 15 hydrologic units or watersheds.

Fish Consumption Advisory

At the time of publication, a fish consumption advisory issued by SCDHEC is in effect for **the Diversion Canal, Lake Moultrie, Cooper River (from the Lake Moultrie dam to Bushy Park), Wadboo Creek, Durham Creek, the Back River Reservoir, and Shipyard Creek** advising people to limit the amount of some types of fish consumed from these waters. Fish consumption advisories are updated annually in March. For background information and the most current advisories please visit the Bureau of Water homepage at http://www.state.sc.us/dhec/eqc/water/ and click on "Advisories" under the Water Subject Index, or go directly to http://www.state.sc.us/dhec/eqc/admin/html/fishadv.html. For more information or a hard copy of the advisories, call SCDHEC's Division of Health Hazard Evaluation toll-free at (888) 849-7241.

Climate

Normal yearly rainfall in the Cooper River/Ashley River area is 49.15 inches, according to the S.C. historic climatological record. Data compiled from National Weather Service stations in Givhans Ferry State Park, Charleston Airport, Charleston, Sullivans Island, Summerville, and at the Pinopolis Dam were used to determine the general climate information for this portion of the State. The highest level of rainfall occurs in the summer with 18.31 inches; 9.90, 9.96, and 11.08 inches of rain falling in the fall, winter, and spring, respectively. The average annual daily temperature is 64.8°F. Summer temperatures average 79.5°F and fall, winter, and spring temperatures are 66.4°F, 48.9°F, and 64.3°F, respectively.

03050201-010

(Lake Moultrie)

General Description

Watershed 03050201-010 is located in Berkeley County and consists primarily of ***Lake Moultrie*** and its tributaries. The watershed occupies 87,731 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Yauhannah-Yemassee-Rains-Lynchburg series. The erodibility of the soil (K) averages 0.17; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 65.2% water, 18.5% forested land, 7.2% forested wetland, 4.2% urban land, 3.3% scrub/shrub land, 1.1% agricultural land, and 0.5% barren land.

Lake Moultrie was created by diverting the Santee River (Lake Marion) through a 7.5 mile Diversion Canal filling a levee-sided basin and impounding it with the Pinopolis Dam. South Carolina Public Service Authority (Santee Cooper) oversees the operation of Lake Moultrie, which is used for power generation, recreation, and water supply. The 4.5 mile Tail Race Canal connects Lake Moultrie with the Cooper River near the Town of Moncks Corner, and the Rediversion Canal connects Lake Moultrie with the lower Santee River. Duck Pond Creek enters the lake on its western shore. The Tail Race Canal accepts the drainage of California Branch and the Old Santee Canal. There are a total of 131.4 stream miles in this watershed, all classified FW. Additional natural resources in the watershed include the Dennis Wildlife Center near the Town of Bonneau, Sandy Beach Water Fowl Area along the northern lakeshore, the Santee National Wildlife Refuge covering the lower half of the lake, and the Old Santee Canal State Park near Monks Corner.

Water Quality

Station #	Type	Class	Description
CSTL-079	P	FW	DIVERSION CANAL AT SC 45 12.6 MI W OF ST STEPHENS
SC-025	SC	FW	DIVERSION CANAL AT SC 45 12.6 MI W OF ST STEPHENS
SC-043	SC	FW	LAKE MOULTRIE TRIB AT SE CORNER OF CROSS GEN. STA.
SC-026	SC	FW	LAKE MOULTRIE TRIB 0.4 MI UPSTREAM OF SC 6
SC-027	SC	FW	LAKE MOULTRIE IN SW QUADRANT
SC-034	SC	FW	DUCK POND CREEK AT SC 6
SC-028	SC	FW	LAKE MOULTRIE IN NW QUADRANT
SC-029	SC	FW	LAKE MOULTRIE IN SOUTHERN QUADRANT
SC-030	SC	FW	LAKE MOULTRIE MID-POINT AT USFWS CHANNEL MARKER 17
SC-031	SC	FW	LAKE MOULTRIE IN NORTHERN QUADRANT
SC-046	SC	FW	LAKE MOULTRIE IN SE QUADRANT OF LAKE
SC-032	SC	FW	LAKE MOULTRIE IN SE QUADRANT AT USFWS CHANNEL MARK. 2
SC-033	SC	FW	TAILRACE CANAL AT DOCK RESTAURANT BOAT SLIP
CSTL-062	P	FW	TAIL RACE CANAL AT US 52 & 17A BELOW LAKE MOULTRIE

Diversion Canal **-** This site is sampled by both SCDHEC ***(CSTL-079)*** and SCPSA ***(SC-025)***. Aquatic life uses are fully. A significant decreasing trend in dissolved oxygen in the SCDHEC samples suggests degrading conditions for this parameter. There was also a significant decreasing trend in pH.

Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations in the SCDHEC samples suggest improving conditions for these parameters. Recreational uses are fully supported and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

***Lake Moultrie* -** Lake Moultrie has a watershed covering 306.9 km^2 (up to the Lake Marion Dam), and a surface area of 24,443.5 hectares with a maximum and mean depth of 23.0m and 6.1m, respectively. Hydropower generation, recreational uses, and domestic water supply have been impaired as a result of abundant aquatic macrophyte growth. Various areas of the lake have been treated with aquatic herbicides since 1989. Beginning in 1993, grass carp were introduced as an additional treatment to control the aquatic plants. A total of 50,000 grass carp were introduced to upper and midlake areas in 1993, and 150,000 more were added in 1994 to several locations in the upper, mid, and lower lake regions. A total of 65,000 fish were stocked in 1995 to upper and midlake areas, 42,000 were stocked to the upper lake in 1996, and no fish were stocked from 1997-1999. The SCPSA samples seven locations on Lake Moultrie and aquatic life and recreational uses are fully supported at all sites.

Tail Race Canal* -** Both SCDHEC ***(CSTL-062) and SCPSA ***(SC-033)*** have monitoring sites along the Tail Race Canal. Aquatic life uses are partially supported at SC-033, due to pH excursions. Recreational uses are fully supported. Aquatic life uses are fully supported at CSTL-062; however there is a significant decreasing trend in dissolved oxygen concentration and a high concentration of zinc was measured in 1996. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are fully supported and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Old Santee Canal State Park Swimming Lake - The lake has been treated annually for the past 10 years with aquatic herbicides in an attempt to control aquatic macrophyte growth that has impaired the lake's recreational uses. In addition, *Tilapia* (200 fish/vegetated acre or 2,000 fish) and grass carp (15 fish/acre or 150 fish) were stocked in 1995, *Tilapia* (2,000 fish) were restocked in 1996, and grass carp (150 fish) were restocked in 1997.

Lake Moultrie Tributary (SC-043) - This site is sampled by the SCPSA. Aquatic life uses are fully supported. Recreational uses are partially supported due to fecal coliform bacteria excursions.

***Lake Moultrie Tributary (SC-026)* -** This site is sampled by the SCPSA. Aquatic life uses are fully supported. Recreational uses are not supported due to fecal coliform bacteria excursions.

Duck Pond Creek (SC-034) - This site is sampled by the SCPSA. Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low pH and dissolved oxygen concentrations.

Although pH and dissolved oxygen excursions occurred, they were typical of values seen in such systems. Recreational uses are partially supported due to fecal coliform bacteria excursions.

A fish consumption advisory has been issued by the Department for mercury and includes the Diversion Canal, Lake Moultrie, and the Tail Race Canal within this watershed (see advisory p.62).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM / ***FACILITY NAME*** / ***PERMITTED FLOW @ PIPE (MGD)*** / ***COMMENT***	***NPDES#*** / ***TYPE*** / ***LIMITATION***
DIVERSION CANAL SC PUB. SERV. AUTH./CROSS GEN. STA. PIPE #: 003 FLOW: 0.079 PIPE #: 001,02A,02B,004 FLOW: M/R	SC0037401 MAJOR INDUSTRIAL EFFLUENT
LAKE MOULTRIE US NAVY/SHORT STAY REC. PIPE #: 001 FLOW: M/R	SC0024708 MINOR INDUSTRIAL EFFLUENT
LAKE MOULTRIE BERKELEY COUNTY/CROSS HIGH SCHOOL PIPE #: 001 FLOW: 0.0158	SC0027103 MINOR DOMESTIC EFFLUENT
TAIL RACE CANAL SC PUB. SERV. AUTH./JEFFERIES STEAM STA. PIPE #: 001 FLOW: 0.006 PIPE #: 002 FLOW: 376 PIPE #: 003,004,006,007 FLOW: M/R	SC0001091 MAJOR INDUSTRIAL EFFLUENT EFFLUENT
TAIL RACE CANAL C.R. BARD, INC. PIPE #: 001 FLOW: 0.382	SC0035190 MAJOR INDUSTRIAL EFFLUENT
TAIL RACE CANAL SC PUB. SERV. AUTH./MONCKS CORNER WTP PIPE #: 001 FLOW:M/R	SCG641011 MINOR DOMESTIC EFFLUENT
DUCK POND CREEK BERKELEY COUNTY/CROSS ELEM SCHOOL PIPE #: 001 FLOW: 0.015 WQL FOR BOD5, NH3-N, DO	SC0034479 MINOR DOMESTIC WATER QUALITY

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE / ***RECEIVING STREAM***	***PERMIT #*** / ***STATUS***
LIONS BEACH CAMPGROUND/FAMILY	08-307-0010

LAKE MOULTRIE	ACTIVE
BONNEAU BEACH CAMPGROUND/FAMILY	08-307-0016
LAKE MOULTRIE	ACTIVE

Mining Activities

MINING COMPANY	***PERMIT #***
MINE NAME	***MINERAL***
CDS INVESTMENTS	0698-15
SANTEE CIRCLE FARMS MINE	SAND

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME	***PERMIT #***
FACILITY TYPE	***STATUS***
SC PUB. SERV. AUTH./CROSS GEN.	085801-1601 (083337-1601, IWP-186)
INDUSTRIAL	ACTIVE
SC PUB. SERV. AUTH./CROSS GEN.	IWP-185
INDUSTRIAL	CLOSED
SC PUB. SERV. AUTH.	083322-1201 (CWP-034)
CONSTRUCTION	--------

Water Supply

WATER USER (TYPE)	***REGULATED CAPACITY (MGD)***
STREAM	***PUMPING CAPACITY (MGD)***
GEORGIA-PACIFIC CORP. (I)	0.43
LAKE MOULTRIE	-----
C.R. BARD, INC. (I)	1.44
TAIL RACE CANAL	------
SANTEE COOPER REG. WTR. AUTH. (M)	30.1
LAKE MOULTRIE	38.0

Growth Potential

There is a moderate potential for growth in this watershed. Lake Moultrie contributes significantly to the growth in the area in terms of fishery tourism and residential development. The Towns of Monk Corner, Cross, and Bonneau should benefit from the lake-based growth. Monks Corner provides both water and sewer services and may encourage future growth. The Pinopolis peninsula has low density residential, including several historic structures, and a Santee Cooper semi-private recreation/conference center. There is a regional domestic water supply system on Lake Moultrie near

Lions Beach (water withdrawn from Pinopolis cove) that serves the Berkeley County Water and Sewer Authority, Moncks Corner, Goose Creek, and the Summerville Public Service Area.

03050201-020

(Wadboo Swamp)

General Description

Watershed 03050201-020 is located in Berkeley County and consists primarily of ***Wadboo Swamp*** and its tributaries. The watershed occupies 80,967 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Bladen-Wahee-Hobcaw-Mouzon-Chipley series. The erodibility of the soil (K) averages 0.17; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 72.3% forested land, 11.8% forested wetland, 8.8% scrub/shrub land, 5.9% agricultural land, 0.8% barren land, 0.3% water, and 0.1% urban land.

Wadboo Swamp originates near the Town of St. Stephen and merges with the Tail Race Canal to form the Cooper River. Gravel Hill Swamp accepts the drainage of Walker Swamp (Halfway Swamp) then flows into Wadboo Swamp followed by Rice Hope Swamp, Stewart Creek, Whiskinboo Creek (Cane Pond Branch), Cane Gully Branch (Graveyard Lead, Peters Swamp, Callum Branch), Bullhead Run (Mary Anne Branch), and Broad Ax Branch (Canady Branch, Mingo Branch). Wadboo Swamp becomes Wadboo Creek downstream of Broad Ax Branch. Walleye Bay, located at the headwaters of Whiskinboo Creek and Cane Gully Branch accepts drainage from Big Ocean Bay, Whitten Bay, and Boggy Swamp. Little Ocean Bay, Graveyard Bay, Huckleberry Bay, and Mill Bay drain into Peters Swamp. There are a total of 172.3 stream miles in this watershed, all classified FW. Another natural resource is the Francis Marion National Forest, which extends across the entire watershed.

Water Quality

Station #	Type	Class	Description
ST-007	S	FW	WALKER SWAMP AT US 52 2.5 MI S ST STEPHENS
CSTL-113	W	FW	WADBOO CREEK AT SC 402

Wadboo Creek (CSTL-113) - Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low dissolved oxygen concentrations. Although dissolved oxygen excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are not supported due to fecal coliform bacteria excursions.

Walker Swamp (ST-007) - Aquatic life uses are fully supported; however there is a significant increasing trend in turbidity. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Phenols were detected in the water column in 1995. Recreational uses are not supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

A fish consumption advisory has been issued by the Department for mercury and includes Wadboo Creek within this watershed (see advisory p.62).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)*** ***COMMENT***	***NPDES#*** ***TYPE*** ***LIMITATION***
HALFWAY SWAMP GA PACIFIC/RUSSELLVILLE PIPE #: 001 FLOW: 0.905 PIPE #: 001A,001B,002 FLOW: M/R * MAPPED IN 03050112-020)	*SCG250179 MINOR INDUSTRIAL EFFLUENT
WADBOO SWAMP MACEDONIA ELEM & HIGH SCHOOL PIPE #: 001 FLOW: 0.0298 WQL FOR BOD_5, TRC, NH3-N, DO	SC0027090 MINOR DOMESTIC WATER QUALITY

Nonpoint Source Management Program

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
WARE BROTHERS, INC. FONDREN EARTH EXCAVATION	0817-15 SAND/GRAVEL

Growth Potential

There is a low potential for growth in this watershed, which contains the Town of Bonneau and portions of the communities of Macedonia and Russellville. A large portion of the watershed is contained within the Francis Marion National Forest.

03050201-030

(Cooper River/West Branch Cooper River)

General Description

Watershed 03050201-030 is located in Berkeley County and consists primarily of the ***Cooper River and the West Branch Cooper River*** and their tributaries. The watershed occupies 36,153 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Bladen-Bohicket-Wahee-Chipley series. The erodibility of the soil (K) averages 0.14; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 57.0% forested land, 12.7% forested wetland, 12.4% water, 7.3% urban land, 7.1% agricultural land, 2.9% scrub/shrub land, and 0.6% barren land.

The Cooper River is formed by the confluence of Lake Moultrie (Tail Race Canal) and Wadboo Creek. The West Branch Cooper River is formed from the confluence of the Cooper River and Mepkin Creek. The West Branch Cooper River accepts drainage from Molly Branch (Stony Branch, Wappoola Swamp) and Durham Creek (Durham Canal). The West Branch Cooper River drains into the Back River watershed (03050201-060) via Durham Creek and the Cooper River. There are a few recreational ponds (10-60 acres) and a total of 166.6 stream miles in this watershed, all classified FW. There also are numerous historic structures in the watershed.

Water Quality

Station #	Type	Class	Description
CSTL-085	S	FW	PIER IN W. BR. COOPER R. AT END OF RICE MILL RD IN PIMLICO

West Branch Cooper River (CSTL-085) - Aquatic life uses are fully supported. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. P,P'DDE (a metabolite of DDT) was detected in the 1997 sediment sample. Although the use of DDT was banned in 1973, it is very persistent in the environment. Recreational uses are partially supported due to fecal coliform bacteria excursions.

A fish consumption advisory has been issued by the Department for mercury and includes the West Branch Cooper River within this watershed (see advisory p.62).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
WEST BRANCH COOPER RIVER	SC0021598

TOWN OF MONCKS CORNER WWTP PIPE #: 001 FLOW: 2.4	MAJOR DOMESTIC WQL FOR NH3-N
WEST BRANCH COOPER RIVER BCW&SA/CENTRAL BERKELEY WWTP PIPE #: 001 FLOW: 1.0	SC0039764 MINOR DOMESTIC EFFLUENT
WAPPOOLA SWAMP SCE&G/WILLIAMS ASH PILE PIPE #: 001 FLOW: M/R UNCONSTRUCTED	SC0046175 MINOR INDUSTRIAL EFFLUENT
MOLLY BRANCH SCE&G/WILLIAMS LANDFILL PIPE #: 001 FLOW: 0.033	SC0039535 MINOR INDUSTRIAL EFFLUENT
MOLLY BRANCH TRIBUTARY OAKLEY VOCATIONAL CENTER PIPE #: 001 FLOW: 0.0075 WQL FOR BOD_5, NH3-N, TRC, DO	SC0026867 MINOR DOMESTIC WATER QUALITY
MOLLY BRANCH D&A PARTNERSHIP/DANGERFIELD MINE PIPE #: 001 FLOW: M/R	SCG730125 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
SCE&G/WILLIAMS STATION INDUSTRIAL	083320-1601 (IWP-191) ACTIVE
SCE&G/GENCO/WILLIAMS STATION INDUSTRIAL	083309-1601 ACTIVE
BERKELEY COUNTY LANDFILL MUNICIPAL	081001-1101 (DWP-105, ACTIVE 081001-1102)
OLD BERKELEY COUNTY MUNICIPAL	DWP-015 CLOSED
OLD BERKELEY COUNTY/NEIGHBORS SITE MUNICIPAL	DWP-073 CLOSED
BERKELEY COUNTY C&D LANDFILL CONSTRUCTION	081001-1201 --------
BERKELEY COUNTY TIRE DISPOSAL MUNICIPAL	081001-5101 --------

Groundwater Contamination

The groundwater in the vicinity of the property owned by Dupont Standard Warehouse is contaminated by volatile organic compounds due to spills and leaks. The stream affected by the contamination is a tributary of Stony Branch. The facility is currently in the assessment phase and the Department is pursuing corrective action.

Growth Potential

Future growth is expected in several areas within the watershed, including the Town of Monks Corner, the Whitesville and Pimlico Communities, and the Berkeley Country Club area. The Town of Monks Corner and Berkeley County operate water and sewer systems in the area, which may allow scattered development.

03050201-040

(East Branch Cooper River)

General Description

Watershed 03050201-040 is located in Berkeley and Charleston Counties and consists primarily of the ***East Branch Cooper River*** and its tributaries. The watershed occupies 123,228 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Yauhannah-Yemassee-Chipley-Hobcaw series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 74.3% forested land, 19.7% forested wetland, 3.3% scrub/shrub land, 2.2% water, and 0.5% agricultural land.

The East Branch Cooper River is formed by the confluence of Huger Creek and Quinby Creek. Prior to the confluence, Huger Creek accepts drainage from Nicholson Creek (Kutz Creek, Darlington Creek, Darlington Swamp, Cooks Creek, Jericho Branch, Fourth of July Branch), Turkey Creek (Huitt Branch, Old Man Lead, Oakie Branch, Muddy Creek, Fox Gully Branch), Negro Field Branch, and Gough Creek (Alligator Creek, Midway Reserve, Little Hellhole Reserve, Little Hellhole Bay, Quarterman Branch, Upper Reserve, Lower Reserve). Quinby Creek accepts drainage from Harleston Dam Creek (Cropnel Dan Creek), Northampton Creek, Bennett Branch, Deep Branch, Pinckney Reserve Branch, Menzer Run, and York Bottom Creek. Bennett Branch flows through a 50-acre recreational pond, and the Hester Canal bypasses Quinby Creek near its mouth. The entire area prior to the confluence of Huger and Quinby Creeks is within the Francis Marion National Forest.

Downstream of the confluence, the East Branch Cooper River receives drainage from Mayrant Lead, French Quarter Creek (Chipper Swamp, Freshing Lead), and Big Dam Lead (Comingtee Creek). There are several recreational ponds and lakes in the watershed (10-150 acres), and a total of 409.4 stream miles, all classified FW.

Water Quality

No monitoring occurred in this watershed.

A fish consumption advisory has been issued by the Department for mercury and includes the East Branch Cooper River within this watershed (see advisory p.62).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM	***NPDES#***
FACILITY NAME	***TYPE***
PERMITTED FLOW @ PIPE (MGD)	***LIMITATION (EL/WQL)***
COMMENT	
EAST BRANCH COOPER RIVER	SC0033073

CAROLINA LOWCOUNTRY GS COUNCIL PIPE #: 001 FLOW: 0.012	MINOR DOMESTIC EFFLUENT
FRENCH QUARTER CREEK FRENCH QUARTER GROUP LP MINE PIPE #: 001 FLOW: M/R	SCG730086 MINOR INDUSTRIAL EFFLUENT
FRENCH QUARTER CREEK CAINHOY ELEMENTARY SCHOOL PIPE #: 001 FLOW: 0.020 WQL FOR DO	SC0037621 MINOR DOMESTIC WATER QUALITY

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE ***RECEIVING STREAM***	***PERMIT #*** ***STATUS***
GIRL SCOUT PLANTATION/RESIDENT EAST BRANCH COOPER RIVER	08-305-0006 ACTIVE

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
FRENCH QUARTER GROUP LP FRENCH QUARTER MINE	0873-15 SAND/CLAY

Growth Potential

There is a low potential for growth expected in this watershed. There are numerous historic structures located in the area, and great public sentiment to preserve the historic character of the area.

03050201-050

(Cooper River)

General Description

Watershed 03050201-050 is located in Berkeley and Charleston Counties and consists primarily of the ***Cooper River*** and its tributaries. The watershed occupies 50,518 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. The predominant soil types consist of an association of the Bohicket-Chipley-Leon-Capers series. The erodibility of the soil (K) averages 0.17; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 29.3% forested land, 24.8% urban land, 19.6% water, 16.5% forested wetland, 4.6% nonforested wetland, 3.5% scrub/shrub land,1.1% agricultural land, and 0.6% barren land.

The Cooper River is formed at "The Tee" by the confluence of the West Branch Cooper River and the East Branch Cooper River and flows past the City of Charleston and into the Charleston Harbor. En route to the Charleston Harbor, the Cooper River accepts drainage from Tidal Creek, Grove Creek (Little Johnson Creek), the Back River watershed (03050201-060), Flag Creek (Pepper Gully), Slack Reach, Yellow House Creek, the Goose Creek watershed (03050201-070), Filbin Creek, Noisette Creek, Clouter Creek, Shipyard Creek, Newmarket Creek, and the Wando River watershed (03050201-080). There are several recreational ponds (10-40 acres) in the watershed. There are a total of 58.8 stream miles and 17.2 square miles of estuarine areas, all classified SB. Other natural resources in this watershed include the Francis Marion National Forest near the Flag Creek headwaters and Cypress Gardens.

Water Quality

Station #	Type	Class	Description
MD-043	P	SB	COOPER RIVER AT CHANNEL MARKER 72 NEAR USN AMMO DEPOT
MD-044	P	SB	COOPER R. BELOW MOUTH OF GOOSE CK AT CHANNEL BUOY 60
MD-249	P	SB	FILBIN CREEK AT VIRGINIA AVE, NORTH CHARLESTON
MD-248	P	SB	COOPER RIVER AT MARK CLARK BRIDGE (I-526)
MD-045	P	SB	COOPER RIVER UPSTREAM OF SHIPYARD CK AT CHANNEL BUOY 49
MD-243	P	SB	SHIPYARD CREEK BETWEEN MARKER #6 AND MCALLOY DOCK
MD-047	P	SB	TOWN CREEK (W SIDE OF DRUM ISL) UNDER GRACE MEM. BRIDGE
MD-046	P	SB	COOPER RIVER UNDER GRACE MEMORIAL BRIDGE

Cooper River - The reduction in freshwater input to the river due to the Cooper River Rediversion Project (1985) has resulted in changes in the hydrologic characteristics of the river and may be responsible in part for some of the long term changes observed in water quality parameters. The Cooper River has been treated annually in the past 10 years with aquatic herbicides in an attempt to control the growth of aquatic macrophytes. The plants need to be reduced in high use areas and trails need to be accessed from the ricefields to open water.

There are six SCDHEC ambient monitoring network sites along this section of the Cooper River. At the furthest upstream site **(MD-043)**, aquatic life uses are fully supported; however there is a significant decreasing trend in dissolved oxygen concentration and a significant increasing trend in turbidity. There is no significant trend in dissolved oxygen concentration when only post-rediversion data (1986-1998) are considered. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, and total nitrogen concentrations suggest improving conditions for these parameters. In sediments, high concentrations of chromium, lead, and nickel were detected in the 1995 sample, and very high concentrations of cadmium, chromium, and lead were detected in the 1998 sample. The lead concentration in 1995 and the cadmium concentration in 1998 exceeded the Effects Range Low (ERL) concentration, but was less than the Effects Range Median (ERM) concentration. Recreational uses are fully supported.

Further downstream **(MD-044)**, aquatic life uses are also fully supported; however there is a significant decreasing trend in dissolved oxygen concentration and a significant increasing trend in turbidity. There is no significant trend in dissolved oxygen concentration when only post-rediversion data (1986-1998) are considered. There is also a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are fully supported.

Aquatic life uses are also fully supported at **MD-248**. This site has only been sampled since 1993, so there is no pre-rediversion data. There is a significant increasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, total nitrogen concentrations, and turbidity suggest improving conditions for these parameters. In the 1994 sediment sample, very high concentrations of chromium, lead, nickel, and zinc were measured, together with a high concentration of copper, and the detection of flouranthene, PCB-1248, and PCB-1260. Chromium, copper, and nickel concentrations exceeded the Effects Range Low (ERL) concentration, but were less than the Effects Range Median (ERM) concentration, and the lead and zinc concentrations exceeded the ERL and ERM. Also in sediments, di-n-butylphthalate was detected in the 1995 sample and P,P DDE (a metabolite of DDT) was detected in the 1997 sample at a concentration that exceeded the ERL, but was less than the ERM. Although the use of DDT was banned in 1973, it is very persistent in the environment. Recreational uses are fully supported at this site, and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Further downstream at **MD-045**, aquatic life uses are also fully supported; however there is a significant decreasing trend in dissolved oxygen concentration and a significant increasing trend in turbidity. There is no significant trend in dissolved oxygen concentration when only post-rediversion data (1986-1998) are considered. There is also a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. In sediment, dieldrin was detected in the 1994 sample at a concentration that exceeded the Effects Range Low (ERL) concentration and the Effects Range Median

(ERM) concentration. Recreational uses are fully supported and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Aquatic life uses are fully supported at **MD-047**; however there is a significant decreasing trend in dissolved oxygen concentration. There is no significant trend in dissolved oxygen concentration when only post-rediversion data (1986-1998) are considered. There is also a significant decreasing trend in pH. A significant decreasing trend in total nitrogen concentrations suggests improving conditions for this parameter. Recreational uses are fully supported.

Aquatic life uses are also fully supported at the furthest downstream site **(MD-046)**; however there is a significant decreasing trend in dissolved oxygen concentration and a significant increasing trend in turbidity. There is no significant trend in dissolved oxygen concentration when only post-rediversion data (1986-1998) are considered. There is also a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are fully supported.

Shipyard Creek (MD-243) - Aquatic life uses are not supported due to sediment contamination and a shellfish consumption ban pertaining to tissue contaminant burden. A high concentration of zinc was measured in the 1994 sediment sample. In the 1995 sediment sample, very high concentrations of chromium, copper, lead, and zinc were measured, together with the detection of chrysene, fluoranthene, pyrene, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, benzo(b)flouranthene, P,P DDT, and P,P DDE. Copper, lead, and P,P DDE concentrations exceeded the Effects Range Low (ERL) concentration, but were less than the Effects Range Median (ERM) concentration. Zinc and P,P DDT concentrations exceeded both the ERL and the ERM. In the 1996 sediment sample, very high concentrations of chromium and zinc, and high concentrations of copper, lead, and nickel were measured, together with the detection of flouranthene, pyrene, and P,P DDT. Chromium, copper, and lead concentrations exceeded the ERL concentration, but were less than the ERM concentration, and the P,P DDT concentration exceeded the ERL and the ERM. In the 1997 sediment sample, high concentrations of chromium, nickel, and zinc were measured, together with the detection of benzo(a)pyrene, anthracene, benzo(b)flouranthene, benzo(k)flouranthene, chrysene, flouranthene, pyrene, benzo(a)anthracene, and P,P DDE. Lead, benzo(a)pyrene, chrysene, flouranthene, pyrene, benzo(a)anthracene, and P,P DDE exceeded the ERL concentrations, but were less than the ERM concentration. Anthracene was detected at a concentration that exceeded both the ERL and ERM. In the 1998 sediment sample, a very high concentration of chromium and high concentrations of copper, nickel, and zinc were measured, together with the detection of P,P DDD and P,P DDE. Copper and P,P DDD concentrations exceeded the ERL concentration, but were less than the ERM concentration. Significant increasing trends in dissolved oxygen concentration and significant decreasing trends in five-day biochemical oxygen demand and total phosphorus concentrations suggest improving conditions for these parameters. Recreational uses are fully supported and a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Filbin Creek (MD-249) - Aquatic life uses are fully supported. There is a significant increasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

A fish consumption advisory has been issued by the Department for mercury and includes the Cooper River and Shipyard Creek within this watershed (see advisory p.62).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)*** ***COMMENT***	***NPDES#*** ***TYPE*** ***LIMITATION***
COOPER RIVER WESTVACO CORP/CHAS. MILL PIPE #: 001 FLOW: 22.9 PIPE #: 002 FLOW: 6.4	SC0001759 MAJOR INDUSTRIAL EFFLUENT EFFLUENT
COOPER RIVER AMERADA HESS/VIRGINIA AVE. N. PIPE #: 001 FLOW: 0.053 PIPE #: 002 FLOW: M/R	SC0002852 MINOR INDUSTRIAL EFFLUENT
COOPER RIVER AMERADA HESS/VIRGINIA AVE. S. PIPE #: 001,002 FLOW: M/R	SC0002861 MINOR INDUSTRIAL EFFLUENT
COOPER RIVER ALLIED TERMINALS/CHAS. PIPE #: 001 FLOW: M/R	SC0001350 MINOR INDUSTRIAL EFFLUENT
COOPER RIVER EQUILON ENTERPRIZES/CHAS. PIPE #: 001 FLOW: 0.055	SC0003026 MINOR INDUSTRIAL EFFLUENT
COOPER RIVER BAYER CORP./BUSHY PARK PLT. PIPE #: 001 FLOW: 4.889 PIPE #: 001A,002 FLOW: M/R WQL FOR NH3-N, BOD5	SC0003441 MAJOR INDUSTRIAL WATER QUALITY
COOPER RIVER KOCH REFINING CO. PIPE #: 001 FLOW: 0.0812 PIPE #: 002 FLOW: M/R	SC0003794 MINOR INDUSTRIAL EFFLUENT
COOPER RIVER US NAVY/CHARLESTON NAVAL SHIPYARD PIPE #: 002,004,009,010,011 FLOW: M/R (PERMIT INACTIVATED)	SC0003816 MINOR INDUSTRIAL EFFLUENT
COOPER RIVER US NAVY/WEAPONS STATION	SC0021385 MINOR INDUSTRIAL

PIPE #: 001 FLOW: 0.056 EFFLUENT

COOPER RIVER SC0043206
US NAVY/WEAPONS STATION MINOR INDUSTRIAL
PIPE #: 001,002,003 FLOW: M/R EFFLUENT

COOPER RIVER SC0003875
RM ENGINEERED PRODUCTS MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.223 EFFLUENT

COOPER RIVER SC0024783
N.CHAS.SWR.DIST./FELIX DAVIS WWTP MAJOR DOMESTIC
PIPE #: 001 FLOW: 27.0 WATER QUALITY
WQL FOR BOD5, DO

COOPER RIVER SC0026506
E.I. DUPONT/COOPER RIVER PLT. MAJOR INDUSTRIAL
PIPE #: 001 FLOW: 1.322 WATER QUALITY
WQL FOR BOD5

COOPER RIVER SC0027502
JACOBS APPLIED TECHNOLOGY, INC. MINOR INDUSTRIAL
PIPE #: 001 FLOW: 0.015 EFFLUENT

COOPER RIVER SC0028584
AMOCO CHEMICALS/COOPER RIVER MAJOR INDUSTRIAL
PIPE #: 001 FLOW: 2.33 EFFLUENT

COOPER RIVER SC0046060
BCW&SA/LOWER BERKELEY WWTP MAJOR DOMESTIC
PIPE #: 001 FLOW: 15.0 WATER QUALITY
WQL FOR DO

COOPER RIVER SC0047708
CHARLESTON SHIPBUILDERS, INC. MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R EFFLUENT
(PERMIT INACTIVATED)

COOPER RIVER SC0047481
DETYENS SHIPYARDS/DRYDOCK#5 MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R EFFLUENT
(NOT MAPPED)

COOPER RIVER SC0047392
NUCOR STEEL/BERKELEY PLT MAJOR INDUSTRIAL
PIPE #: 001-003 FLOW: M/R WATER QUALITY
WQL FOR DO

COOPER RIVER TRIBUTARY SC0043273
MT PLEASANT WATER PLANT #2 MINOR DOMESTIC
PIPE #: 001 FLOW: M/R EFFLUENT

COOPER RIVER TRIBUTARY SCG250040
EVENING POST PUBLISHING CO. MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R EFFLUENT

TIDAL CREEK TO COOPER RIVER	SC0047074 (Not Mapped)
CHARLESTON CPW/DANIEL ISLAND	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.5	WATER QUALITY
WQL FOR TRC,DO,NH_3-N,BOD_5	
TIDAL CREEK TO COOPER RIVER	SC0003883
SCE&G/WILLIAMS STATION	MAJOR INDUSTRIAL
PIPE #: 001-005 FLOW: M/R	EFFLUENT
FILBIN CREEK	SC0021997
DEFENSE FUEL SUPPORT PT/CHAS.	MINOR INDUSTRIAL
PIPE #: 001,002 FLOW: M/R	EFFLUENT
FILBIN CREEK	SC0001759
WESTVACO CORP/CHAS.	MAJOR INDUSTRIAL
PIPE #: 004 FLOW: 5.0	EFFLUENT
FILBIN CREEK	SC0034134
MARATHON ASHLAND/N. CHAS.	MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R	EFFLUENT
SHIPYARD CREEK	SC0001023
CHEVRON PRODUCTS/CHAS.	MINOR INDUSTRIAL
PIPE #: 001,001A FLOW: M/R	EFFLUENT
SHIPYARD CREEK	SC0004014
MACALLOY CORPORATION	MINOR INDUSTRIAL
PIPE #: 001,002,004 FLOW: M/R	EFFLUENT
PIPE #: 003 FLOW: 0.013	
SHIPYARD CREEK	SC0048046 (NOT MAPPED)
KINDER MORGAN BULK TERM.	MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R	EFFLUENT
SHIPYARD CREEK	SC0041173
FOSTER WHEELER RESOURCE RECOV.	MINOR INDUSTRIAL
PIPE #: 001-004 FLOW: M/R	EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
OL THOMPSON CONSTR. CO., INC.	0962-15
PRIMUS TRACT	SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
WESTVACO LANDFILL	IWP-177, IWP-090, IWP-150
INDUSTRIAL	--------

CHARLESTON/SPRUIL AVE. DUMP	---------
MUNICIPAL	CLOSED
GASTON DUMP	---------
MUNICIPAL	CLOSED
HOLSTON LANDFILL	DWP-003
MUNICIPAL	NEVER OPENED
ROMEY STREET LANDFILL	DWP-079, DWP-061
MUNICIPAL	CLOSED

Groundwater Contamination

The groundwater in the vicinity of the surface dust impoundment owned by MacAlloy Corporation (#00274) is contaminated with chromium. The facility is currently in the remediation phase, and a dust impoundment closure and further site assessment is managed by RCRA and EPA. The surface water affected by the groundwater contamination is Shipyard Creek.

The groundwater in the vicinity of the property (#00785) owned by Foster Wheeler (formerly Charleston Resource Recovery) is contaminated with volatile organics from an unknown source. The full impact is being assessed with new monitoring wells. The surface water affected by the groundwater contamination is Shipyard Creek.

Also affecting a tributary of Shipyard Creek is groundwater in the vicinity of the property owned by WR Grace & Co. (SCD003343191), which is contaminated with pesticides and herbicides from unpermitted disposal. The assessment is complete and a treatability study is in progress.

A source of contamination to the Cooper River is the groundwater contaminated with metals and organic compounds as a result of unpermitted disposal by the previous owners (SCE&G, City of Charleston, and City of Charleston Housing Authority) of the land now owned by the National Park Service (#SCD987572674). Construction of the New Charleston Marina is now in progress.

Also affecting the Cooper River is groundwater in the vicinity of the property owned by Calhoun Park/Ansonborough Homes (SCD987581337), which is contaminated with organic compounds from unpermitted disposal. The facility is in the remedial alternative selection and design phase.

Water Supply

WATER USER (TYPE) ***STREAM***	***REGULATED CAPACITY (MGD)*** ***PUMPING CAPACITY (MGD)***
WR GRACE & CO. (I)	0.432
COOPER RIVER	------

Growth Potential

The Union Terminal (Sea Port Facility) within the City of Charleston is projected to be an area of population growth. The population in the urban areas west of the Cooper River have declined in the last decade and are not expected to grow in the near future. The U.S. Navy Base/Shipyard was closed by the Navy in 1996. The Office/Manufacturing/Industrial reuses of this property will occur well into the future, but residential uses are not significant components of the Base Reuse Plan. The Bushy Industrial Park, which includes several very large industries, is also located in this watershed, and should continue to encourage industrial growth.

Watershed Protection and Restoration

Special Models

The Charleston Harbor Models

Two different models have been developed for wasteload allocations purposes for the Charleston Harbor system. The initial model was developed through the Charleston Harbor Project (CHP) and the second model was developed by Applied Technologies and Management (ATM) for the Cooper River Water Users Association. Working in conjunction with the Department, the University of South Carolina, Clemson University, and the United States Geological Survey (USGS), CHP s goal was to develop a tool for the Department's use in point source wasteload allocation and Total Maximum Daily Load (TMDL) determination. The modeled domain, for both models, encompasses the Cooper River and its major tributaries from Pinopolis Dam to its confluence with the Wando River, the Wando River from its headwaters to the confluence with the Cooper River, and the Ashley River from Bacon Bridge downstream to the U.S. Hwy. 17 Bridge. Hydrodynamics, for CHP s effort, are modeled using the one-dimensional BRANCH model while water quality is modeled using the one-dimensional Branched Lagrangian Transport Model. Modeling data were collected in May and August of 1993 by the Department and the USGS. Hydrodynamics, for ATM s effort, are modeled using the two-dimensional boundary fitted circulation model. Water quality is modeled using the two dimensional WQMAP which uses EPA WASP5 eutrophication model kinetics. Modeling data were collected in September 1996 by ATM and August of 1993 by the Department and the USGS. The Department plans on using the two models in concert to determine TMDL and point source wasteload allocations for the Charleston Harbor system.

03050201-060

(Back River)

General Description

Watershed 03050201-060 is located in Berkeley County and consists primarily of the ***Back River*** and its tributaries. The watershed occupies 49,163 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Bladen-Wahee-Bohicket-Hobcaw series. The erodibility of the soil (K) averages 0.17; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 64.1% forested land, 12.7% forested wetland, 12.1% urban land, 5.1% agricultural land, 3.9% scrub/shrub land, 1.7% water, and 0.4% barren land.

The Back River forms from swamp drainage and flows into the Cooper River. Laurel Swamp (Gants Mill Branch, Tillmans Branch, Poplar Branch, Daisy Swamp, King Branch, Huckhole Swamp), Sophia Swamp (Lindsey Branch, Brick Bound Swamp), and Canterhill Swamp flow into the Back River, which is joined downstream by Chicken Creek. The Back River is dammed further downstream to create the Back River Reservoir (also know as the Bushy Park Reservoir) and insure freshwater storage for industrial purposes. Water is not released from the dam but is pumped into the Cooper River near Bushy Industrial Park. The waters downstream from the dam are essentially backflow from the Cooper River (SB). Prioleau Creek (Long Field Pond, Crane Pond) enters Back River Reservoir in the upper lake region and Foster Creek enters the reservoir near the dam. There are numerous recreational ponds (15-50 acres) in the watershed and a total of 179.1 stream miles, all classified FW.

Water Quality

Station #	Type	Class	Description
MD-152	P	FW/SB	BACK RIVER (COOPER R. WATER) AT S-08-503
MD-217	P	FW	DURHAM CREEK AT S-08-9 BRIDGE
MD-240	P	FW	FOSTER CREEK AT CHARLESTON CPW WATER INTAKE

***Back River* (*MD-152*)** - This site is essentially Cooper River water that has backed up due to the nonreleasing dam on the Back River. The reduction in freshwater input to the Cooper River due to the Cooper River Rediversion Project (1985) has resulted in changes in the hydrologic characteristics of the river and may be responsible in part for some of the long term changes observed in water quality parameters. The site is located in a transition area between fresh and salt waters and shows characteristics of both. Aquatic life uses are fully supported. There was a significant decreasing trend in dissolved oxygen concentration, a significant increasing trend in turbidity, and a very high concentration of zinc measured in 1995. There is no significant trend in dissolved oxygen concentration when only post-rediversion data (1986-1998) are considered. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. A very high concentration of chromium and a high concentration of nickel and lead were detected in the 1994 sediment sample, and a very high concentration of cadmium, chromium, and nickel,

and a high concentration of zinc were detected in the 1998 sample. The lead concentration in 1994 and 1995, and the cadmium and nickel concentrations in 1998 exceeded the Effects Range Low (ERL) concentration, but were less than the Effects Range Median (ERM) concentration. Recreational uses are fully supported.

Back River Reservoir - The reservoir (850 acres) has been treated annually during the past ten years with aquatic herbicides in an attempt to control the growth of aquatic macrophytes in areas of public access and at water intakes.

Foster Creek (MD-240) - Aquatic life uses are not supported due to dissolved oxygen excursions and occurrences of copper in excess of the aquatic life acute standards. In addition, there is a significant increasing trend in total phosphorus concentrations, a very high concentration of cadmium measured in 1994, and a high concentration of copper measured in 1995 and 1997. There is also a significant increasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand concentration suggests improving conditions for this parameter. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Durham Creek (MD-217) - Aquatic life uses are fully supported; however there was a very high concentration of chromium measured in 1995. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are fully supported.

A fish consumption advisory has been issued by the Department for mercury and includes the Back River Reservoir within this watershed (see advisory p.62).

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)*** ***COMMENT***	***NPDES#*** ***TYPE*** ***LIMITATION (EL/WQL)***
BACK RIVER BAYER CORP. PIPE #: 003 FLOW: M/R	SC0003441 MAJOR INDUSTRIAL EFFLUENT
LINDSEY BRANCH JW ALUMINUM CO. PIPE #: 001 FLOW: M/R	SCG250105 MINOR INDUSTRIAL EFFLUENT
POPLAR BRANCH THOMAS DANIELS 17A BORROW PIT PIPE #: 001 FLOW: M/R	SCG730005 MINOR INDUSTRIAL EFFLUENT
LAUREL SWAMP KC MHP #3	SC0032859 MINOR DOMESTIC

PIPE #: 001 FLOW: 0.015	WATER QUALITY
WQL FOR BOD_5, NH3-N, TRC, DO	

Nonpoint Source Management Program

Mining Activities

MINING COMPANY	*PERMIT #*
MINE NAME	*MINERAL*
ACRE MAKER, A PARTNERSHIP	0743-15
17A MINE PIT	SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME	*PERMIT #*
FACILITY TYPE	*STATUS*
SANTEE RIVER RUBBER CORP.	082623-5201
INDUSTRIAL	--------

Water Supply

WATER USER (TYPE)	*REGULATED CAPACITY (MGD)*
STREAM	*PUMPING CAPACITY (MGD)*
MILES INC. (I)	8.64
BACK RIVER RESERVOIR	------
EI DUPONT (I)	3.24
BACK RIVER RESERVOIR	------
AMOCO CHEMICAL CO.(I)	9.00
BACK RIVER RESERVOIR	------
FOXBORO GOLF RESORT (I)	8.64
BACK RIVER RESERVOIR	------
CITY OF CHARLESTON (M)	125.0
FOSTER CREEK	150.0

Growth Potential

There is a moderate potential for growth in the form of scattered low density development. Water and sewer service is available to most of the watershed. Fresh water is a vital necessity to the area's economy. The Back River and its tributaries are a major source of fresh water for the public water supply and many of the large industries located along the Cooper River. Another source is the interbasin transfer via a pipeline connecting the Edisto River to the Hanahan WTP.

03050201-070

(Goose Creek)

General Description

Watershed 03050201-070 is located in Berkeley, Charleston, and Dorchester Counties and consists primarily of ***Goose Creek*** and its tributaries. The watershed occupies 38,633 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Bohicket-Bladen-Wahee-Yonges series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 41.5% urban land, 31.8% forested land, 17.8% forested wetland, 3.4% scrub/shrub land, 2.6% agricultural land, 2.6% water, 0.2% nonforested wetland, and 0.1% barren land.

Ancrum Swamp and Huckhole Swamp flow into Bluehouse Swamp (Ladson Branch, McChune Branch) to form the headwaters of Goose Creek, which is dammed into Goose Creek Reservoir and used for recreation and water supply. Goose Creek is classified FW from its headwaters to the Goose Creek Reservoir Dam, and SB downstream from the reservoir. Turkey Creek (SB) flows into Goose Creek downstream of the reservoir near the Town of Hanahan. Old Goose Creek drains into Goose Creek as does New Tenant Pond, Brown Pond, and Logan Pond before it flows into the Cooper River. The entire watershed is within the U.S. Naval Reserve. There are a total of 52.7 stream miles in this watershed, and 2.7 square miles of estuarine areas.

Water Quality

Station #	Type	Class	Description
MD-114	P	FW	GOOSE CREEK AT U.S. 52 N CHTN
ST-033	W	FW	GOOSE CK RES. AT 2ND POWER LINES UPSTREAM OF BOAT RAMP
MD-113	P	FW	GOOSE CREEK RESERVOIR AT CHAS WTR INTAKE
ST-032	P	FW	GOOSE CREEK RESERVOIR 100 M UPSTREAM OF DAM
MD-039	P	SB	GOOSE CREEK AT S-08-136 BRIDGE

Goose Creek - There are two SCDHEC ambient monitoring network sites along Goose Creek. At the site above Goose Creek Reservoir **(MD-114)**, aquatic life uses are not supported due to dissolved oxygen excursions, compounded by pH excursions. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Aquatic life uses are fully supported at **MD-039**; however there is a significant increasing trend in turbidity. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are not supported at this site due to fecal coliform bacteria excursions.

Goose Creek Reservoir - Goose Creek Reservoir has a watershed covering 15.9 km^2, a surface area of 242.8 hectares, and a maximum and mean depth of 4.3m and 2.4m, respectively. Swimming and boating usages of the lake may be impaired due to abundant submerged aquatic plants lakewide, and emergent and floating plants near the dam. Goose Creek Reservoir has been treated annually for the past ten years with aquatic herbicides in an attempt to control the growth of aquatic macrophytes that have impaired the lake's recreational and water supply uses. Fishing is also impaired due to low dissolved oxygen levels. Grass Carp were introduced into the reservoir in 1991 (10 fish/vegetated acre or 4000 fish), and restocked in 1995 (15 fish/acre or 6,000 fish).

There are three SCDHEC ambient monitoring network sites on Goose Creek Reservoir. Although pH excursions occurred and copper exceeded the aquatic life acute standards at the furthest uplake site **(ST-033)**, due to the small number of samples, aquatic life use support determination is inconclusive. Recreational uses are fully supported at this site. At **MD-113**, aquatic life uses are not supported due to dissolved oxygen excursions, compounded by significant decreasing trends in dissolved oxygen concentration. There is also significant decreasing trends in pH. Recreational uses are partially supported at this site due to fecal coliform bacteria excursions. At **ST-032**, aquatic life uses are partially supported due to dissolved oxygen excursions, compounded by significant increasing trends in total phosphorus concentrations, total nitrogen concentrations, and turbidity, and a very high concentration of zinc measured in 1994. There is also a significant increasing trend in pH. Recreational uses are fully supported.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)***	***NPDES#*** ***TYPE*** ***LIMITATION***
GOOSE CREEK CITY OF HANAHAN PIPE #: 001 FLOW: 1.3 WQL FOR NH3-N	SC0021041 MAJOR DOMESTIC WATER QUALITY
GOOSE CREEK CHARLESTON CPW/HANAHAN WTP PIPE #: 001 FLOW: M/R	SC0040266 MINOR DOMESTIC EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
BANKS CONSTRUCTION COMPANY LAKEVIEW MINE	0488-19 SAND/CLAY
BUTLER WARE TRUCKING, INC. TAYLOR STREET PIT	0737-19 SAND/CLAY

ROBERT O. COLLINS COMPANY, INC. SPRINGROVE MINES	0595-19 SAND/CLAY
LB CARSON GRANT CITY NORTH	0818-19 SAND

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
M&S DEVELOPMENT CO. INDUSTRIAL	IWP-136 --------
G&S ROOFING PRODUCTS INDUSTRIAL	102434-1601 (IWP-046, IWP-162) ACTIVE
ROBERT O. COLLINS C/C LANDFILL CONSTRUCTION	102407-1201 (CWP-039) ---------
PEPPERHILL DEVELOPMENT C&D CONSTRUCTION	182441-1201 (182441-1601) ACTIVE
S.C. PUB. SERV. AUTH./CHARLESTON MUNICIPAL	DWP-004 CLOSED
WESTVACO/CHARLESTON CO. INDUSTRIAL	--------- CLOSED

Land Application Sites

LAND APPLICATION SYSTEM ***FACILITY NAME***	***ND#*** ***TYPE***
SPRAYFIELD CHARLESTON CPW/HANAHAN	ND0073491 DOMESTIC

Groundwater Contamination

The groundwater in the vicinity of the property owned by DFSC - Perimeter Road (#16456) is contaminated with petroleum products resulting from spills and leaks. The facility is currently in the remediation phase, and an upgrade is pending. The surface water affected by the groundwater contamination is a tributary to Turkey Creek.

Water Supply

WATER USER (TYPE) ***STREAM***	***REGULATED CAPACITY (MGD)*** ***PUMPING CAPACITY (MGD)***
CITY OF CHARLESTON (M) GOOSE CREEK RESERVOIR	125.0 150.0

Growth Potential

The primary population growth areas in this watershed include the Town of Hanahan, North Charleston, and Berkeley County. In addition, the Charleston County Parks and Recreation Commission has purchased a large parcel of land above Goose Creek Reservoir for development as a county park. The interbasin transfer of fresh water via a pipeline connecting the Edisto River to the Hanahan WTP will help to provide for growth in this area.

Watershed Protection and Restoration

Special Projects

Goose Creek Reservoir Restoration

Goose Creek Reservoir is located in Berkeley County, north of the City of Charleston. Nuisance aquatic plant growth, and fish kills as a result of low dissolved oxygen, have occurred. Through a Section 319 grant, a group of cooperating agencies, led by the Berkeley County Soil and Water Conservation District, is conducting NPS educational programs and demonstrations. Included will be a Lake Fair, an event that gets lake and watershed residents actively involved in improving the water quality of their lake.

03050201-080

(Wando River)

General Description

Watershed 03050201-080 extends through Berkeley and Charleston Counties and consists primarily of the ***Wando River*** and its tributaries. The watershed occupies 73,061 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Chipley-Yonges-Kiawah-Chisolm series. The erodibility of the soil (K) averages 0.12; the slope of the terrain averages 1%, with a range of 0-6%. Land use/land cover in the watershed includes: 53.0% forested land, 16.9% forested wetland, 8.8% nonforested wetland, 11.8% water, 5.7% urban land, 2.5% scrub/shrub land, 1.2% agricultural land, and 0.1% barren land.

The Wando River accepts drainage from the Iron Swamp (Mayrants Reserve), Alston Creek, Darrell Creek, Deep Creek, Toomer Creek, and Wagner Creek before receiving Guerin Creek drainage (Lachicotte Creek, Old House Creek, Fogarty Creek) near Cat Island. The Guerin Creek drainage flows through the Francis Marion National Forest. Johnfield Creek enters the river downstream followed by Horlbeck Creek (Boone Hall Creek), Fosters Creek, Beresfords Creek (Martin Creek, Sanders Creek, Hopewell Creek), Ralston Creek, Rathall Creek and Bermuda Creek. Beresford Creek is connected to Clouter Creek in watershed 03050201-050. From the headwaters to a point 2.5 miles north of its confluence with the Cooper River, the Wando River is Classified SFH; downstream of this point to its confluence with the Cooper River, the Wando River is classified SA. Hobcaw Creek (Lake Woodlawn) and Molasses Creek enter the Wando River at the base of the watershed (SFH) near the Town of Mount Pleasant. The Wando River then drains into the Cooper River which flows into the Charleston Harbor. There are a total of 0.6 stream miles and 26.0 square miles of estuarine area in this watershed.

Water Quality

Station #	Type	Class	Description
MD-115	P	SFH	WANDO RIVER AT S.C. 41
MD-198	P	SFH/SA	WANDO RIVER BETWEEN RATHALL & HOBCAW CKS

Wando River **-** There are two SCDHEC ambient monitoring network sites along the Wando River and recreational uses are fully supported at both sites. At the upstream site **(MD-115)**, aquatic life uses are partially supported due to dissolved oxygen excursions, compounded by a significant decreasing trend in dissolved oxygen concentrations and a significant increasing trend in turbidity. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. A high concentration of copper and zinc were measured in the 1997 sediment sample, together with the detection of lindane. The copper concentration exceeded the Effects Range Low (ERL) concentration, but was less than the Effects Range Median (ERM) concentration. The lindane concentration exceeded the ERL concentrations and the ERM concentration.

Further downstream at **MD-198**, aquatic life uses are fully supported; however there is a significant decreasing trend in dissolved oxygen concentrations and a significant increasing trend in turbidity. There is also a significant decreasing trend in pH. Significant decreasing trend in total nitrogen concentrations suggests improving conditions for this parameter.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
WANDO RIVER DETYENS SHIPYARDS PIPE #: 001 FLOW: 0.025	SC0033022 MINOR INDUSTRIAL EFFLUENT
MOLASSES CREEK COOPER HALL RETIREMENT PIPE #: 001 FLOW: M/R (Mapped in 03050202-070)	SCG250160 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
ISLAND CONSTRUCTION CO., INC. R&L PIT	0568-19 SAND/CLAY
C & G INVESTMENTS LUCKER MINE	0735-19 SAND
SHELLMORE FARMS (LJ INC.) SHELLMORE FARMS MINE	0641-19 SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
MT PLEASANT TRANSFER STATION MUNICIPAL	101002-6001 --------

Growth Potential

There is a high potential for growth projected for this watershed. Some of the major development areas include: Dunes West, Liberty, Rivertowne, Brickyard, Long Point, Belle Hall, and Daniel Island. Water and sewer services are available in all potential growth areas.

Watershed Protection and Restoration

Special Models

The Charleston Harbor Models

Two different models have been developed for wasteload allocations purposes for the Charleston Harbor system. The initial model was developed through the Charleston Harbor Project (CHP) and the second model was developed by Applied Technologies and Management (ATM) for the Cooper River Water Users Association. Working in conjunction with the Department, the University of South Carolina, Clemson University, and the United States Geological Survey (USGS), CHP s goal was to develop a tool for the Department's use in point source wasteload allocation and Total Maximum Daily Load (TMDL) determination. The modeled domain, for both models, encompasses the Cooper River and its major tributaries from Pinopolis Dam to its confluence with the Wando River, the Wando River from its headwaters to the confluence with the Cooper River, and the Ashley River from Bacon Bridge downstream to the U.S. Hwy. 17 Bridge. Hydrodynamics, for CHP s effort, are modeled using the one-dimensional BRANCH model while water quality is modeled using the one-dimensional Branched Lagrangian Transport Model. Modeling data were collected in May and August of 1993 by the Department and the USGS. Hydrodynamics, for ATM s effort, are modeled using the two-dimensional boundary fitted circulation model. Water quality is modeled using the two dimensional WQMAP which uses EPA WASP5 eutrophication model kinetics. Modeling data were collected in September 1996 by ATM and August of 1993 by the Department and the USGS. The Department plans on using the two models in concert to determine TMDL and point source wasteload allocations for the Charleston Harbor system.

03050202-010

(Cypress Swamp)

General Description

Watershed 03050202-010 is located in Berkeley and Dorchester Counties and consists primarily of ***Cypress Swamp*** and its tributaries from its origin to Captains Branch. The watershed occupies 100,347 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Hobcaw-Lynchburg-Mouzon series. The erodibility of the soil (K) averages 0.20; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 71.5% forested land, 13.2% forested wetland, 6.6% agricultural land, 6.6% scrub/shrub land, 0.9% urban land, 0.6% barren land, 0.5% water, and 0.1% nonforested wetland.

Williams Branch flows into Big Run and is joined by Black Creek to form Wassamassaw Swamp, which accepts drainage from Mill Branch, Caton Creek, and Simmons Bay. Partridge Creek (Rudd Branch, Mill Branch) joins Wassamassaw Swamp to form the headwaters of the Cypress Swamp. The Cypress Swamp receives drainage from Sandy Run (Smith Branch), Miller Dam Branch, Felder Branch, Dawson Branch, Stanley Branch (Kelly Branch), and Green Bay Branch near the Town of Ridgeville. There are a total of 236.4 stream miles in this watershed, all classified FW.

Water Quality

Station #	Type	Class	Description
CSTL-063	P	FW	WASSAMASSAW SWAMP AT U.S. 176
CSTL-078	W	FW	CYPRESS SWAMP AT U.S. 78

Wassamassaw Swamp (CSTL-063) - Aquatic life uses are fully supported, but there is a significant increasing trend in turbidity. This is a blackwater system, characterized by naturally low dissolved oxygen concentrations. Although dissolved oxygen excursions occurred, they were typical of values seen in such systems and were considered natural, not standards violations. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. P,P'DDT was detected in the 1995 and 1997 sediment samples and P,P'DDE was also detected in the 1995 sample. Although the use of DDT was banned in 1973, it is very persistent in the environment. Recreational uses are partially supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations.

Cypress Swamp (CSTL-078) - Aquatic life uses are fully supported. This is a blackwater system, characterized by naturally low dissolved oxygen concentrations. Although dissolved oxygen excursions occurred, they were typical of values seen in blackwater systems and were considered natural, not standards violations. Recreational uses are not supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
MILL BRANCH D&A PARTNERSHIP/CUMBIE PIT PIPE #: 001 FLOW: M/R	SCG730115 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
ACD, A PARTNERSHIP DANGERFIELD MINE (17A)	0625-15 SAND/CLAY
SALISBURY BRICK CORPORATION NEW HOPE MINE	0722-15 CLAY
BROWNING-FERRIS IND. OF S. ATLANTIC JEDBURG, S-8-16	0837-15 SAND/CLAY
SALISBURY BRICK CORPORATION SALISBURY BRICK MINE	0562-35 CLAY
SALISBURY BRICK CORPORATION RED HILL MINE	0972-35 CLAY
SALISBURY BRICK CORPORATION DUKES MINE	0979-35 CLAY
JOHN R. CUMBIE JOHN R. CUMBIE MINE	0747-15 SAND/CLAY
TRULUCK INDUSTRIES, INC. BERKELEY MINE	0935-15 SAND

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
WESTVACO INDUSTRIAL	082430-1601 (IWP-201) ACTIVE
BFI MUNICIPAL	DWP-129, DWP-163 CLOSED
TRIDENT NORTH LANDFILL (BFI) INDUSTRIAL	IWP-163 CLOSED

Growth Potential

Low density population growth is projected to occur in this watershed.

03050202-020

(Cypress Swamp/Ashley River)

General Description

Watershed 03050202-020 is located in Dorchester and Berkeley Counties and consists primarily of the ***Cypress Swamp*** and the ***Ashley River*** and their tributaries from Captains Branch to Dorchester Creek. The watershed occupies 48,170 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Daleville-Jedburg-Meggett-Brookman series. The erodibility of the soil (K) averages 0.28; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 51.7% forested land, 17.4% forested wetland,10.4% urban land, 9.8% scrub/shrub land, 8.6% agricultural land, 1.3% nonforested wetland, 0.5% water, and 0.3% barren land.

Cypress Swamp accepts drainage from Captains Creek (McKeown Branch), Platt Branch, Rumphs Hill Creek (Negro Branch), Tina Branch, and Hurricane Branch. The confluence of Cypress Swamp and Hurricane Branch forms the headwaters of the Ashley River near the Town of Summerville. The river then flows through Bobs Lake and Schultz Lake to Bacon Bridge and drains into the lower Ashley River. Upstream of Bacon Bridge, the river is classified FW and downstream of the bridge, the river is classified SA. There are a total of 112.0 stream miles in this watershed.

Water Quality

Station #	Type	Class	Description
CSTL-102	P	FW/SA	ASHLEY RIVER AT SC 165 4.8 MI SSW OF SUMMERVILLE

Ashley River (CSTL-102) - This site is located in a transition area between fresh and salt waters and shows characteristics of both. Aquatic life uses are not supported due to dissolved oxygen excursions, compounded by a significant decreasing trend in dissolved oxygen concentrations. Recreational uses are partially supported due to fecal coliform bacteria excursions.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)*	*NPDES#* *TYPE* *LIMITATION*
ASHLEY RIVER CWS/TEAL-ON-ASHLEY PIPE #: 001 FLOW: 0.03 WQL FOR NH_3-N,DO,TRC,BOD_5	SC0030350 MINOR DOMESTIC WATER QUALITY

ASHLEY RIVER DICARI INC./BACONS BRIDGE MINE PIPE #: 001 FLOW: M/R	SCG730077 MINOR INDUSTRIAL EFFLUENT
PLATT BRANCH LINQ INDUSTRIAL FABRICS, INC. PIPE #: 001 FLOW: M/R WQL FOR DO, TRC, BOD5	SC0003905 MINOR INDUSTRIAL WATER QUALITY

Nonpoint Source Management Program

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
TIDELAND UTILITIES, INC. TIDELAND FILL PIT	0483-15 SAND/CLAY
MURRAY MINES, INC. MURRAY MINE	0044-18 SAND
TS SMALLS, INC. ACKERMAN PIT	0843-18 SAND
TS SMALLS, INC. 642 PIT	0670-18 SAND/CLAY
SWEAT'S DIRT HAULING, INC. HWY 642 DIRT PIT	0917-18 SAND/CLAY
SWEAT'S DIRT HAULING, INC. HWY 61 DIRT PIT	0887-35 SAND/CLAY
DICARI, INC. BEACONS BRIDGE MINE	1058-35 SAND/CLAY
PALMETTO SAND CO. THE PONDS	1150-35 SAND

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
AMERIACAN RESOURCES INC. --------	182415-5201 --------
WESTCO PLANTATION INDUSTRIAL	182437-1201 (IWP-138, CWP-036)) ACTIVE

Growth Potential

There is a high potential for growth in this watershed, and water and sewer services are available to these growth areas.

03050202-030

(Dorchester Creek/Eagle Creek)

General Description

Watershed 03050202-030 is located in Berkeley, Charleston, and Dorchester Counties and consists primarily of ***Dorchester Creek and Eagle Creek*** and their tributaries. The watershed occupies 21,968 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Yauhannah-Yemassee-Meggett-Brookman series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 1%, with a range of 0-6%. Land use/land cover in the watershed includes: 44.3% urban land, 27.6% forested land, 20.9% forested wetland, 3.2% agricultural land, 3.6% scrub/shrub land, 0.2% barren land, and 0.2% water.

Sawmill Branch (Limehouse Branch, Stroberfield Branch) flows past the Town of Summerville and is joined by Rose Creek to form Dorchester Creek, which flows into the Ashley River. Sawmill Branch is classified FW, and Dorchester Creek takes on the classification of the Ashley River, which is SA. Limehouse Branch is connected to Ancrum Swamp in watershed 03050201-070. Eagle Creek (SB) accepts drainage from Chandler Bridge Creek, Spencer Branch, and Federwitz Branch before draining into the Ashley River. There are a total of 31.7 stream miles in this watershed.

Water Quality

Station #	Type	Class	Description
CSTL-043	S	FW	SAWMILL BRANCH AT SC 78 E OF SUMMERVILLE
CSTL-013	P	SA	DORCHESTER CREEK AT SC 165
CSTL-099	P	SB	EAGLE CREEK AT SC 642 5 MI SSE OF SUMMERVILLE

Sawmill Branch (CSTL-043) - Aquatic life uses are not supported due to dissolved oxygen excursions. There is a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

Dorchester Creek (CSTL-013) - Aquatic life uses are partially supported due to dissolved oxygen and pH excursions. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, total nitrogen concentrations, and turbidity suggest improving conditions for these parameters. Very high concentrations of chromium, copper, and nickel were measured in the 1996 sediment sample, with copper and nickel exceeding their respective Effects Range Median (ERM). Also in sediments, the PAHs fluoranthene, phenanthrene, pyrene, and benzo(a)anthracene were detected in the 1997 sample, with fluoranthene and phenanthrene both exceeding the Effects Range Low (ERL) concentrations, but less than ERM concentrations. Recreational uses are not supported due to fecal coliform bacteria excursions. A significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

***Eagle Creek* (CSTL-099)** - Aquatic life uses are fully supported. This is a tidally influenced system, often characterized by naturally low pH. Although pH excursions occurred, they were typical of values seen in such systems and were considered natural, not standards violations. Significant decreasing trends in five-day biochemical oxygen demand and turbidity suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
SALISBURY BRICK CORPORATION SALISBURY BRICK MINE	0549-15 CLAY
L.J., INC. LADSON FARMS	0644-19 SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
TOWN OF SUMMERVILLE MUNICIPAL	181002-6001 ---------

Growth Potential

There is a high potential for growth in this watershed, which includes areas in both Dorchester and Berkeley Counties. Water and sewer services are available in these growth areas.

Watershed Protection and Restoration

Special Projects

Watershed Resource Restoration In A Tributary Of The Ashley River

The SCDHEC-OCRM Charleston Harbor Project, using Section 319 funding, conducted a wetlands restoration project along a tributary to the Ashley River. In cooperation with Dorchester County, the Town of Summerville, and the U.S. Army Corps of Engineers, a 9.5 acre wetland along Sawmill Branch Canal was selected for restoration. The area had been altered by the Corps in the 1960s to prevent flooding, and the spoils placed between the wetland and the canal. This isolated the wetland and caused degradation of water quality in the wetland and canal. To remedy this problem, flow pipes were placed beneath the berm created by the spoil. This connected the wetland to the canal once again. Stormwater draining from nearby subdivisions now has an opportunity to be filtered through natural

processes before entering Sawmill Branch Canal. The project produced an informative booklet, *Wetland Restoration: An Alternative Way to Treat NPS Pollution*.

03050202-040

(Ashley River)

General Description

Watershed 03050202-040 is located in Dorchester and Charleston Counties and consists primarily of the ***Ashley River*** and its tributaries from Dorchester Creek to the Charleston Harbor. The watershed occupies 44,461 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. The predominant soil types consist of an association of the Bohicket-Udorthents-Udipsamments-Yonges series. The erodibility of the soil (K) averages 0.20; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 44.9% urban land, 29.3% forested land, 13.1% nonforested wetland, 7.2% water, 4.1% forested wetland, 1.1% scrub/shrub land, and 0.3% agricultural land.

This segment of the Ashley River originates at Bacon Bridge and accepts drainage from the Dorchester Creek watershed (03050202-030). The river then flows past the Old Dorchester State Park and Middleton Gardens to receive drainage from Coosaw Creek, Olive Branch, and Sawpit Creek. Popperdam Creek enters the river near Magnolia Gardens, the Charleston U.S. Air Force Base, and the Municipal Airport. Further downstream, MacBeth Creek enters the river followed by Keivling Creek and Church Creek. The Ashley River is classified SA from Bacon Bridge to Church Creek, where it changes from SA to SA* (DO not less than 4 mg/l) and remains SA* to the entrance of Orangegrove Creek (Oldtown Creek). Between Church Creek and Orangegrove Creek, the Ashley River receives drainage from Bulls Creek (SA*), Brickyard Creek (SB), and Duck Island Canal (SA*). Downstream of Orangegrove Creek, the Ashley River reverts its classification to SA and drains into the Charleston Harbor and the Atlantic Ocean. In addition to the Old Dorchester State Park and the historic gardens and plantations, another natural resource in the watershed is the historic Charles Towne Landing State Park on the Ashley River near Bulls Creek. There are a total of 13.8 stream miles in this watershed and 13.9 square miles of estuarine areas.

Water Quality

Station #	Type	Class	Description
MD-049	P	SA	ASHLEY RIVER AT MAGNOLIA GARDENS
MD-246	P	SA*	CHURCH CREEK MOUTH
MD-135	S	SA*	ASHLEY RIVER AT S.C. 7 (NORTH BRIDGE)
MD-052	P	SA	ASHLEY RIVER AT SAL RR BRIDGE

***Ashley River* -** There are three monitoring sites along this section of the Ashley River. At the furthest upstream site **(MD-049)**, aquatic life uses are not supported due to dissolved oxygen excursions and occurrences of copper in excess of the aquatic life acute standard, compounded by a significant increasing trend in turbidity. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are

not supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations. Downstream of Church Creek **(MD-135)**, aquatic life uses are fully supported, but there is a significant increasing trend in turbidity. Recreational uses are fully supported.

At the furthest downstream site **(MD-052)**, aquatic life uses are partially supported due to dissolved oxygen excursions. In addition, there was a significant decreasing trend in dissolved oxygen concentration and a significant increasing trend in turbidity. There was also a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. In sediments, very high concentrations of cadmium and nickel were measured in the 1998 sample, as was a high concentration of chromium. The cadmium concentration exceeded the Effects Range Low (ERL) concentration, but was less than the Effects Range Median (ERM) concentration. High concentrations of zinc were measured in the 1995 and 1998 sediment samples. Recreational uses are fully supported at this site.

Church Creek (MD-246) - Aquatic life uses are partially supported due to dissolved oxygen excursions. There is also a significant increasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are not supported due to fecal coliform bacteria excursions.

Charles Towne Landing State Park Pond - The pond has been treated annually in the past ten years with aquatic herbicides in an attempt to control the growth of aquatic macrophytes that have impaired bank fishing and boating access. *Tilapia* were introduced in 1991, at a stocking rate of 200 fish/vegetated acre for a total of 1000 fish. The fish were restocked annually at the same rate and numbers from 1992 to1996.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)*** ***COMMENT***	***NPDES#*** ***TYPE*** ***LIMITATION***
ASHLEY RIVER SCE&G/HAGOOD STATION PIPE #: 002 FLOW: 0.049	SC0002011 MINOR INDUSTRIAL EFFLUENT
ASHLEY RIVER G&S ROOFING PRODUCTS PIPE #: 001-003 FLOW: M/R	SC0002771 MINOR INDUSTRIAL EFFLUENT
ASHLEY RIVER KOPPERS INDUSTRIES NPL	PROPOSED MINOR INDUSTRIAL

PIPE #: 001 FLOW: M/R	EFFLUENT
ASHLEY RIVER	SC0037541
TOWN OF SUMMERVILLE/WWTP	MAJOR DOMESTIC
PIPE #: 001 FLOW: 10.0	WATER QUALITY
WQL FOR NH3-N,DO,TRC,BOD5	
ASHLEY RIVER	SC0039063
MIDDLETON INN	MINOR DOMESTIC
PIPE #: 001 FLOW: 0.014	WATER QUALITY
WQL FOR TRC	
ASHLEY RIVER	SC0044202
AMERADA HESS #40260	MINOR INDUSTRIAL
PIPE #: 001 FLOW: M/R	WQL FOR BOD
(PERMIT INACTIVATED)	
BRICKYARD CREEK	SC0002771
G&S ROOFING PRODUCTS	MINOR INDUSTRIAL
PIPE #: 003 FLOW: M/R	EFFLUENT
CHURCH CREEK	SC0026069
CHARLESTON CPW/PIERPONT PLT	MAJOR DOMESTIC
PIPE #: 001 FLOW: 1.5	WATER QUALITY
WQL FOR NH3-N,DO,TRC	
COOSAW SWAMP	SC0038822
DORCHESTER PUB.WKS./LOWER DORCHESTER PLT	MAJOR DOMESTIC
PIPE #: 001 FLOW: 4.0	WATER QUALITY
WQL FOR BOD5,NH3-N,D0,TRC	

Nonpoint Source Management Program

Mining Activities

MINING COMPANY ***MINE NAME***	***PERMIT #*** ***MINERAL***
CROSS COUNTY LAND & DEVELOPMENT CO.	0374-19
CROSS COUNTY MINE	SAND/CLAY
CROSS CREEK INVESTORS, A PARTNERSHIP	0425-19
CROSS CREEK MINE	SAND/CLAY
W. FRAZIER CONSTRUCTION, INC.	1012-35
MIDDLETON MINE	SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
MOORE DRUMS	--------
INDUSTRIAL	--------
CHARLESTON COUNTY DUMP	---------

MUNICIPAL	CLOSED
G&S ROOFING PRODUCTS	IWP-046
INDUSTRIAL	-------
LOCKWOOD BLVD. DUMP	-------
MUNICIPAL	CLOSED

Land Application Sites

LAND APPLICATION SYSTEM FACILITY NAME	*ND# TYPE*
SPRAYFIELD	ND0017736
BURRIS CHEMICAL	INDUSTRIAL

Groundwater Contamination

The groundwater in the vicinity of the property owned by Koppers-Charleston ***(#SCD980310239)*** is contaminated with volatile and nonvolatile organics (Creosote) and metals. The source of the contamination includes surface impoundments, aboveground storage tanks, spills/leaks, and unpermitted disposals. The facility is currently in the assessment and remediation phases. The interim groundwater action construction has been completed. The surface water affected by the groundwater contamination is the Ashley River.

The groundwater in the vicinity of the property owned by Albright & Wilson Americas ***(#SCD003358389)*** is contaminated with volatile organics, metals, petroleum products, nitrates, pesticides, and herbicides due to aboveground storage tanks and underground storage tanks. The facility is currently in the assessment and remediation phases. The interim measures have been completed. The surface water affected by the groundwater contamination is the Ashley River.

The groundwater in the vicinity of the property owned by Lockheed Martin Aerospace ***(#SCD048372023)*** is contaminated with volatile organics and metals due to pits, ponds, and lagoons. Chromium and trichloroethylene are the main contaminants. The facility is currently in the remediation phase. The surface water affected by the groundwater contamination is a tributary of Brickyard Creek.

Growth Potential

The west bank of the Ashley River contains numerous historic structures including Middleton Place, Drayton Hall, Magnolia Gardens, Runnymead Plantation, and Charles Towne Landing State Park; all are important scenic, cultural, and tourism resources. Areas with a high potential for growth include Amberwood, Jerico on the Ashley, Summerfield, River Oaks, and Shadowmoss in Charleston County; and Coosaw Creek, Whitehall, Avanti Tract, Appian Landing, Bakers Landing, Indigo Fields, and Ricefield/Windsor Hill in Dorchester County. There is water and sewer services available to all these growth areas.

Watershed Protection and Restoration

Special Projects

Brickyard Urban Watershed NPS Mitigation

Brickyard Creek flows through a commercial/ industrial section of Charleston County to the Ashley River. It is highly impacted by urban runoff. A 1990 Section 319 project in this watershed identified the categories and locations of NPS inputs, formed a task force of cooperating agencies, designed a set of watershed specific BMPs, and with the help of the cooperators, forged the *Brickyard Creek NPS Action Plan*. Charleston County government agreed to consider implementing the recommendations of the Plan.

Special Models

The Charleston Harbor Models

Two different models have been developed for wasteload allocations purposes for the Charleston Harbor system. The initial model was developed through the Charleston Harbor Project (CHP) and the second model was developed by Applied Technologies and Management (ATM) for the Cooper River Water Users Association. Working in conjunction with the Department, the University of South Carolina, Clemson University, and the United States Geological Survey (USGS), CHP s goal was to develop a tool for the Department's use in point source wasteload allocation and Total Maximum Daily Load (TMDL) determination. The modeled domain, for both models, encompasses the Cooper River and its major tributaries from Pinopolis Dam to its confluence with the Wando River, the Wando River from its headwaters to the confluence with the Cooper River, and the Ashley River from Bacon Bridge downstream to the U.S. Hwy. 17 Bridge. Hydrodynamics, for CHP s effort, are modeled using the one-dimensional BRANCH model while water quality is modeled using the one-dimensional Branched Lagrangian Transport Model. Modeling data were collected in May and August of 1993 by the Department and the USGS. Hydrodynamics, for ATM s effort, are modeled using the two-dimensional boundary fitted circulation model. Water quality is modeled using the two dimensional WQMAP which uses EPA WASP5 eutrophication model kinetics. Modeling data were collected in September 1996 by ATM and August of 1993 by the Department and the USGS. The Department plans on using the two models in concert to determine TMDL and point source wasteload allocations for the Charleston Harbor system.

03050202-050

(Stono River)

General Description

Watershed 03050202-050 is located in Dorchester and Charleston Counties and consists primarily of the ***Stono River*** and its tributaries from Log Bridge Creek to Wappoo Creek. The watershed occupies 156,936 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. The predominant soil types consist of an association of the Meggett-Brookman-Bladen-Chisolm series. The erodibility of the soil (K) averages 0.15; the slope of the terrain averages 1%, with a range of 0-6%. Land use/land cover in the watershed includes: 66.9% forested land, 8.9% scrub/shrub land, 6.8% forested wetland, 6.8% nonforested wetland, 5.8% urban land, 1.8% agricultural land, 2.9% water, and 0.1% barren land.

This segment of the Stono River, classified SFH, runs from Log Bridge Creek (near to its connection with the Edisto River Basin) to Wappoo Creek (which connects to the Ashley River), and drains into the lowest segment of the Stono River. Scotts Branch flows into Fishburne Creek which in turn flows into Horse Savanna and Rantowles Creek. Rantowles Creek accepts drainage from the Wallace River (Caw Caw Swamp, Drayton Swamp, Caddin Bridge Swamp) and then flows into the Stono River. Log Bridge Creek (Middle Branch, Mellichamp Branch) also flows into the Stono River and shares drainage with the Wallace River. Downstream from the SCL Railroad Bridge, the Stono River incorporates the drainage of Long Branch Creek, Sandy Bay, and Elliott Cut (Wappoo Creek). Wappoo Creek is classified SB. There are a total of 502.9 stream miles in this watershed and 8.6 square miles of estuarine areas.

Water Quality

Station #	Type	Class	Description
MD-121	S	SFH	LOG BRIDGE CREEK AT SC 162
MD-202	P	SFH	STONO R. AT S-10-20 2 MI UPSTR OF CLEMSON EXP. STATION
MD-025	S	SFH	MOUTH OF ELLIOTT CUT AT EDGE WATER DR (S-10-26 OFF HW 17)
MD-020	P	SB	MOUTH OF WAPPOO CREEK BETW CHANNEL MARKERS 3 & 4

Log Bridge Creek (MD-121) - Aquatic life uses are fully supported; however there are significant increasing trends in pH and turbidity. This is a tidally influenced system, often characterized by naturally low pH and dissolved oxygen concentrations. Although pH and dissolved oxygen excursions occurred, they were typical of values seen in such systems and were considered natural, not standards violations. Recreational uses are not supported due to fecal coliform bacteria excursions.

Stono River (MD-202) - Aquatic life uses are partially supported due to dissolved oxygen excursions, compounded by significant decreasing trends in dissolved oxygen concentrations and significant increasing trends in total phosphorus concentrations and turbidity. There was also a significant

increasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand, total phosphorus concentrations, and total nitrogen concentrations suggest improving conditions for these parameters. In sediments, a very high concentration of zinc was measured in the 1997 sample, which exceeded the Effects Range Low (ERL) concentration, but was less than the Effects Range Median (ERM) concentration. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Elliott Cut (MD-025) - Water quality at this site is influenced by water entering from Charleston Harbor on the rising tide. Aquatic life uses are not supported due to dissolved oxygen excursions, compounded by a significant decreasing trend in dissolved oxygen concentrations. There was also a significant decreasing trend in pH. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are partially supported due to fecal coliform bacteria excursions; however a significant decreasing trend in fecal coliform bacteria concentration suggests improving conditions for this parameter.

Wappoo Creek (MD-020) - Water quality at this site is influenced by water entering from Charleston Harbor on the rising tide. Aquatic life uses are fully supported; however there is a significant decreasing trend in dissolved oxygen concentrations and there was a high concentration of zinc measured in 1996. There is also a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. Recreational uses are fully supported; however there is a significant increasing trend in fecal coliform bacteria concentrations.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)*** ***COMMENT***	***NPDES#*** ***TYPE*** ***LIMITATION***
STONO RIVER SWYGERT SHIPYARD, INC. PIPE #: 001 FLOW: 0.0066	SC0037770 MINOR INDUSTRIAL EFFLUENT
STONO RIVER DITCH CHARLESTON CPW/SAVAGE RD PIPE #: 001 FLOW: 1.50	SC0026051 MAJOR DOMESTIC EFFLUENT
MIDDLE BRANCH D&A PARTNERSHIP/RAVENEL MINE PIPE #: 001 FLOW: M/R	SCG730126 MINOR INDUSTRIAL EFFLUENT
LOG BRIDGE CREEK GEIGER C & M OIL PIPE #: 001 FLOW: 0.115	PROPOSED MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE *RECEIVING STREAM*	*PERMIT #* *STATUS*
LAKE AIRE CAMPGROUND/FAMILY WALLACE RIVER	10-307-0019 ACTIVE

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
TRULUCK CONSTRUCTION CO., INC. PLANT SITE	0196-19 SAND
FELDER TRUCK LINES PALMETTO PIT #3	0645-19 SAND/CLAY
ADDCO MINING COMPANY EVERGREEN MINE	0252-35 SAND/CLAY
ROYAL LAND, INC. ROYAL LAND #1 MINE	0695-19 SAND/CLAY
RW MCDANIELS CONSTR. & MINING CO. MCDANIEL MINE	0894-19 SAND/CLAY
ST. PAULS LAND COMPANY, INC. ST. PAULS LAND COMPANY, INC. #2	1024-19 CLAY
MURRAY MINES, INC. BEECH HILL	1026-35 SAND/CLAY
D&A, LLC RAVENEL MINE	1089-19 SAND/CLAY
PALMETTO SAND CO., INC. FISHBURNE CREEK MINE	1092-35 SAND
MURRAY MINES, INC. TREE HOUSE MINE	1110-35 SAND
MAD-DOG MINING CORP. MAD-DOG #1	1120-19 SAND/CLAY

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME *FACILITY TYPE*	*PERMIT #* *STATUS*
BEES FERRY MUNICIPAL	101001-1201 (101001-1101, ACTIVE DWP-124, DWP-083)
TRIDENT LANDFILL MUNICIPAL	DWP-005 CLOSED

Growth Potential

The areas with a high potential for growth in the watershed include Stono Ferry in Hollywood; Rushland Plantation, Headquarters Plantation, and Fenwick Acres on Johns Island; and Bees Landing and Essex Farms in the City of Charleston. Water and sewer services are available to all these growth areas.

Watershed Protection and Restoration

Special Projects

Demonstration of Alternative to Individual Onsite Disposal Systems

This project, undertaken by the SCDHEC Division of Onsite Wastewater Management, constructed an innovative wastewater treatment system especially designed for poorly drained soils, called an artificial wetlands wastewater treatment system or rock/plant filter onsite wastewater treatment system. Using Section 319 funds, the project has successfully demonstrated how this best management practice can be used for onsite wastewater disposal. A Hollywood, S.C. home site was selected for the project due to severe septic system failures and the homeowners willingness to try an innovative solution. The home is located in a subdivision in southwestern Charleston County. A performance evaluation of South Carolina septic tank systems in 1987 identified homes in the development as having significant septic system problems. This is due, in particular, to the poorly drained soil with a shallow seasonal high water table.

The system is modeled on one developed by Dr. B.C. Wolverton, who designed a simple backyard system that purifies septic tank discharges. The rock/plant system consists of stones buried in a shallow ditch and plants rooted in the stones. Partially treated sewage from the septic tank flows through the stone filter, providing moisture and nutrients to the plants. Together, the plants and stone filter cleanse the septic tank discharge while adding beauty to the lawn. The only upkeep is harvesting some plants once or twice a year.

Water samples collected at both ends of the rock/plant filter demonstration project were analyzed for nitrate nitrogen, five-day biochemical oxygen demand (BOD5), total suspended solids (TSS), and fecal coliform bacteria. Preliminary results showed that the filter effectively removed bacteria and BOD5. Based on six samples collected between March and July 1992, the system removed 95 percent of the fecal coliform bacteria from the incoming wastewater. During the study, the bacteria level at the inlet measured 230,000 per 100 milliliters; on the same day, the bacteria level at the outlet was 80 bacteria per 100 milliliters--a treatment efficiency of 99.97 percent.

A second artificial wetland on a similar problem soil was constructed in Horry County and appears to be functioning properly. The success of those two systems has led state sanitation officials to consider artificial wetlands as appropriate solutions for emergency repair of malfunctioning septic tank systems.

03050202-060

(Atlantic Intracoastal Waterway)

General Description

Watershed 03050202-060 is located in Charleston County and consists primarily of the ***Atlantic Intracoastal Waterway*** and its tributaries from the Ben Sawyer Bridge to the South Santee River. The watershed occupies 118,578 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Capers-Chipley series. The erodibility of the soil (K) averages 0.20; the slope of the terrain averages 1%, with a range of 0-2%. Land use/land cover in the watershed includes: 40.3% nonforested wetland, 26.9% forested land,19.1% water, 5.7% scrub/shrub land, 4.1% forested wetland, 2.9% urban land, 0.5% agricultural land, and 0.5% barren land.

This watershed consists of the Atlantic Intracoastal Waterway (AIWW), which flows past numerous sea islands and the tidally influenced creeks that separate them. This reach of the AIWW is classified SFH. There are a total of 117.6 square miles of estuarine areas in this watershed. Inlet Creek, Swinton Creek, and Conch Creek located near Sullivans Island, drain to the Atlantic Ocean via Breach Inlet. Morgan Creek, Seven Reaches, and Cedar Creek flow into Meeting Reach (AIWW). Seven Reaches also drains into Gray Sound (SFH)as does Hamlin Creek and Long Creek. Hamlin and Long Creeks also flow into Hamlin Sound (SFH), which in turn drains into Copahee Sound (ORW) and Bullyard Sound (ORW). Dewees Creek collects drainage from Bullyard Sound and Hamlin Sound, together with Old House Creek and Horsebend Creek, and flows through Dewees Inlet (SFH) to the Atlantic Ocean.

Capers Creek, Watermelon Creek, Toomer Creek, and Whiteside Creek drain to the ocean through Capers Inlet (ORW). The Santee Pass connects Capers Creek to Mark Bay (ORW) and drains to the ocean via Price Inlet (ORW). Other streams draining into Price Inlet include Price Creek, Clauson Creek, and Bull Narrows. Bull Narrows also flows into Sewee Bay (SFH) and Hickory Bay. Back Creek connects Sewee Bay to Bull Creek (Summerhouse Creek, Jack Creek), which flows into Bull Harbor and Bulls Bay (ORW). Other streams draining into Bull Harbor and Bulls Bay include Anderson Creek, Blind Creek, Venning Creek, Belvedere Creek, Vanderhorst Creek, Saltpond Creek, and Graham Creek.

Bell Creek (Cooter Creek, Withey Wood Canal) and Steed Creek join to form Awendaw Creek and Lake Awendaw (125 acres), which flows into the Harbor River (AIWW) and into Bulls Bay. Other streams draining into the Harbor River from the mainland, near the Town of McClellanville, include Sandy Point Creek, Doe Hall Creek, Tibwin Creek, and Long Creek. Bull River (Sett Creek, Little Sett Creek) and Five Fathom Creek (Clark Creek, Key Creek, Key Bay, Santee Path Creek, Papas Creek, Little Papas Creek, Matthews Creek, Town Creek, Clubhouse Creek) drain directly into Bulls Bay. Five Fathom Creek is classified SFH. Jeremy Creek flows into the AIWW across the waterway from

Five Fathom Creek. Clubhouse Creek connects Five Fathom Creek to Oyster Bay and Muddy Bay (Nellie Creek, Joe and Ben Creek, Shrine Creek, Horsehead Creek).

The Romain River is formed at the confluence of Santee Path Creek and Nellie Creek, and accepts drainage from Key Creek (Bay Creek), Muddy Bay, and Slack Reach (Devils Den Creek, Horsehead Creek, Mill Den Creek) before flowing into Cape Romain Harbor (ORW). Key Creek also drains into the ocean via Raccoon Creek and Key Inlet. Other streams draining in Cape Romain Harbor include Congaree Boat Creek (Joe and Ben Creek), Casino Creek (Mill Creek, Needles Eye Creek), Deepwater Creek, and Alligator Creek (Ramhorn Creek). Additional natural resources in the watershed include the Cape Romain National Wildlife Refuge (55,000 acres) and portions of the Frances Marion National Forest.

Water Quality

Station #	Type	Class	Description
MD-069	P	SB/SFH	AIWW AT SC 703 E MOUNT PLEASANT
MD-250	W	SFH	AWENDAW CREEK AT US 17
MD-203	P	SFH	JEREMY CK NEAR BOAT LANDING -MCCLELLANVILLE TOWN HALL

Awendaw Creek (MD-250) - Aquatic life uses are fully supported. This is a tidally influenced system, often characterized by naturally low pH and dissolved oxygen concentrations. Although pH and dissolved oxygen excursions occurred, they were typical of values seen in such systems and were considered natural, not standards violations. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Jeremy Creek (MD-203) - Aquatic life uses are fully supported; however there is a significant increasing trend in total nitrogen concentrations, and a very high concentration of zinc was measured in 1998. There is also a significant increasing trend in pH. P,P'DDE (a metabolite of DDT) was detected in the 1997 sediment sample and exceeded the Effects Range Low (ERL) concentration, but was less than the Effects Range Median (ERM) concentration. Although the use of DDT was banned in 1973, it is very persistent in the environment. Recreational uses are partially supported due to fecal coliform bacteria excursions.

Atlantic Intracoastal Waterway (MD-069) - Aquatic life uses are fully supported; however there is a significant decreasing trend in dissolved oxygen concentrations. There is also a significant decreasing trend in pH. Recreational uses are fully supported.

Santee Coastal Reserve Pond **-** The pond was treated in 1994, 1995, 1997, and 1998 with aquatic herbicides to control aquatic plant growth and reclaim recreational areas for waterfowl management and hunting.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM *FACILITY NAME* *PERMITTED FLOW @ PIPE (MGD)* *COMMENT*	*NPDES#* *TYPE* *LIMITATION*
JEREMY CREEK TRIBUTARY LINCOLN HIGH SCHOOL WWTP PIPE #: 001 FLOW: 0.016	SC0033618 MINOR DOMESTIC WQL FOR BOD_5, TRC, NH3-N, DO
HAMLIN CREEK CITY OF ISLE OF PALMS WTP PIPE #: 001 FLOW: M/R WQL FOR TRC	SC0043583 MINOR DOMESTIC WATER QUALITY
MEETING REACH ISLE OF PALMS/FOREST TRAILS SD PIPE #: 001 FLOW: 0.30	SC0025283 MINOR DOMESTIC EFFLUENT
DEWEES CREEK TOWN OF DEWEES ISLAND WTP PIPE #: 001 FLOW: 0.025 UNCONSTRUCTED	SC0046817 MINOR DOMESTIC EFFLUENT
CLAUSON CREEK LOWCOUNTRY DIRT/SCHAFFER MINE PIPE #: 001 FLOW: M/R	SCG730102 MINOR INDUSTRIAL EFFLUENT
AIWW UNNAMED TRIBUTARY ST JAMES/SANTEE ELEM. PIPE #: 001 FLOW: M/R	SCG645033 MINOR DOMESTIC EFFLUENT
AIWW UNNAMED TRIBUTARY CHAS. CPW/BEAN PIT PIPE #: 001 FLOW: M/R	SCG730226 MINOR INDUSTRIAL EFFLUENT
AIWW UNNAMED TRIBUTARY MT PLEASANT/CENTER ST. PIPE #: 004 FLOW: M/R	SC0040771 MAJOR DOMESTIC EFFLUENT
AIWW UNNAMED TRIBUTARY D&A PARTNERSHIP/SHELLPOINT PIT PIPE #: 001 FLOW: M/R	SCG730074 MINOR INDUSTRIAL EFFLUENT

Nonpoint Source Management Program

Mining Activities

MINING COMPANY *MINE NAME*	*PERMIT #* *MINERAL*
ISLAND CONSTRUCTION CO., INC. MOUNT PLEASANT PIT	0183-19 SAND/CLAY
ADDCO MINING COMPANY	0236-19

SHELL POINT MINE	SAND/CLAY
ISLAND DIRT, INC.	0657-19
OAKLAND MINE	SAND/CLAY
LOWCOUNTRY DIRT, INC.	1004-19
SCHAFFER MINE	SAND/TOPSOIL
CHARLESTON CO. PUBLIC WORKS	1159-19
BEAN PIT	SAND

Land Disposal Activities

Landfill Facilities

SOLID WASTE LANDFILL NAME ***FACILITY TYPE***	***PERMIT #*** ***STATUS***
PINCKNEY ROAD DUMP	-------
MUNICIPAL	CLOSED
ISLE OF PALMS DUMP	-------
MUNICIPAL	CLOSED

Land Application Sites

LAND APPLICATION SYSTEM ***FACILITY NAME***	***ND#*** ***TYPE***
TILE FIELD	ND0069329
DEWEES UTILITY CORP.	DOMESTIC
SPRAYFIELD	ND0080446
VILLAGE VARIETY LAUNDROMAT	INDUSTRIAL
SPRAY ON GOLF COURSE	ND0062260
ISLE OF PALMS/WILD DUNES BEACH	DOMESTIC
SPRAYFIELD	ND0073016
CHAS. CO. SCHOOLS/LINCOLN HIGH SCHOOL	DOMESTIC

Growth Potential

There is a high potential for growth in this watershed. Several suburban growth areas surround the City of Charleston. Some of the larger planned developments include Wild Dunes, Shell Point, Hidden Lakes, Seaside Farms, Palmetto Fort, and the Charleston National Country Club. All growth areas in the watershed have water and sewer services available. Sources of tourism in this watershed include Patriots Point and Fort Moultrie. Although the McClellanville area experiences scattered low density development, significant growth is not anticipated.

Watershed Protection and Restoration

Special Projects

East Cooper NPS Management Plan

The Department of Health and Environmental Control implemented a comprehensive project in a coastal watershed located in Charleston County. Five cooperating agencies implemented various components of the project. The stated goal of the project was to maintain and enhance existing water quality and uses in this urban and suburban watershed by reducing and/or eliminating NPS pollution . The primary objective was to develop an action plan that would be adopted and implemented at the local level. Secondary objectives included: 1) establishment of a sustainable public information/education program to foster attitude changes in citizens, influence appropriate local government action, and transfer specific information on how to prevent NPS pollution to target audiences, 2) documentation of pollution sources and specific problem areas through monitoring followed by selection of the most responsive, workable and cost-effective BMPs to control the identified sources, and 3) post-implementation monitoring to determine progress toward meeting the goal. Project outputs included: 1) publication and continued implementation of the *East Cooper NPS Management Project Action Plan*, 2) development and production of educational materials specifically for the project such as *Turning the Tide* newsletter, informational video, project poster, various brochures, and curriculum enhancement materials, and 3) development and implementation of a monitoring strategy based on field identification of potential sources or land uses, aerial photography, and analysis of existing water quality data. The Clean Water Council, a local citizens group then implemented the Action Plan in a continuation of phase one of the project. Efforts focused on municipal official and public NPS education. The group also continued and built upon the water quality monitoring begun at the outset of the project in 1991. The recommendations of the Action Plan were incorporated into the City of Isle of Palms Comprehensive Plan.

03050202-070

(Charleston Harbor/Stono River)

General Description

Watershed 03050202-070 is located in Charleston County and consists primarily of the ***Charleston Harbor*** and its tributaries, and the ***Stono River*** with its tributaries from Wappoo Creek to the Atlantic Ocean. The watershed occupies 81,620 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Capers-Kiawah-Foxworth series. The erodibility of the soil (K) averages 0.20; the slope of the terrain averages 1%, with a range of 0-6%. Land use/land cover in the watershed includes: 26.5% nonforested wetland, 25.0% water, 23.8% forested land, 10.1% scrub/shrub land, 10.0% urban land, 3.2% agricultural land, 1.1% forested wetland, and 0.3% barren land.

This segment of the Stono River, classified SFH, accepts drainage from the upper Stono River watershed (03050202-050), flows between Johns Island and James Island, and then flows through the Stono Inlet to the Atlantic Ocean. On the Johns Island side of the river, the Stono River receives drainage from Pennys Creek, Hut Creek, Abbapoola Creek, Alligator Creek, and the Kiawah River. The Kiawah River accepts drainage from Captain Sams Creek, Haulover Creek, Bryans Creek, and Chaplin Creek. The Kiawah River drains directly into the Atlantic Ocean through Captain Sams Inlet. Bass Creek (Cinder Creek) drains into the Stono River from Kiawah Island.

Streams draining into the Stono River from James Island include James Island Creek or Ellis Creek (Simpson Creek, Wolfpit Run), Holland Island Creek, and Green Creek. The Folly River (Folly Creek, Oak Island Creek, Robbins Creek, King Flats Creek, Cutoff Reach, Cole Creek), classified SFH, drains into the Stono River at the mouth of the Stono River. Robbins Creek and King Flats Creek are also connected to the Stono River through Green Creek. Lighthouse Creek (Block Island Creek, Rat Island Creek, Ft. Johnson Creek, First Sister Creek, Second Sister Creek) flows between Folly Island and Morris Island and through Lighthouse Inlet to the ocean. Ft. Johnson Creek connects the Lighthouse Creek drainage to Clark Sound (Seaside Creek, Secessionville Creek). The sound drains into Charleston Harbor through Schooner Creek near Fort Sumter. Charleston Harbor is classified SB. The Ashley River watershed (03050202-040) draining into the harbor is classified SA and the Cooper River watershed (03050201-050) draining into the harbor is classified SB. Also draining in the Charleston Harbor is Dill Creek, Horse Creek, Shem Creek (SB), The Cove (Cove Creek), Bass Creek, and Parrot Point Creek. There are a total of 66.2 square miles of estuarine areas in this watershed.

Water Quality

Station #	Type	Class	Description
MD-026	P	SFH	STONO RIVER AT SC 700
MD-034	P	SA	RT BK OF ASHLEY R. BTWN MOUTH OF JAMES IS. CK & DILL CK
MD-165	P	SB	CHARLESTON HARBOR AT FT JOHNSON PIER AT MARINE SCI LAB
MD-048	P	SB	S.CHANNEL CHAS HARBOR OFF FT JOHNSON STA BELL BUOY 28

MD-247	P	SB	CHARLESTON HARBOR NEAR MT. PLEASANT WWTP DIFFUSER
MD-071	P	SB	SHEM CREEK AT BRIDGE ON US 17
MD-206	S	SFH	STONO RIVER AT ABBAPOOLA CREEK
MD-207	S	SFH	KIAWAH RIVER MOUTH AT STONO RIVER
MD-208	S	SFH	STONO RIVER MOUTH AT BUOY 10 OFF SANDY POINT

Charleston Harbor - The Charleston Harbor is located at the confluence of the Ashley (03050202-040), Cooper (03050201-050), and Wando (03050201-080) Rivers. The surface area of the harbor is 65 km^2 with an additional 104 km^2 of marsh and lowlands. The harbor drains an area of 42,000 km^2, and has a mean tidal range of 1.6m with an average depth of low water of 3.7m. The Ashley and Wando Rivers exhibit little freshwater input; however, the Cooper River is fed by freshwater from Lake Moultrie through the Pinopolis Dam with average daily flows ranging from 0.0 cfs to 20,240 cfs.

There are three monitoring sites in the Charleston Harbor. Near the Mount Pleasant wastewater treatment plant discharger **(MD-247)**, aquatic life uses are fully supported; however there was a very high concentration of zinc measured in 1996 and a very high concentration of nickel measured in 1998. A significant decreasing trend in total nitrogen concentrations suggests improving conditions for this parameter. Recreational uses are fully supported.

At the Fort Johnson pier **(MD-165)**, aquatic life uses are fully supported; however there is a significant increasing trend in turbidity. A significant decreasing trend in total nitrogen concentrations suggests improving conditions for this parameter. Recreational uses are fully supported; however there is a significant increasing trend in fecal coliform concentrations.

Off the Fort Johnson quarantine station **(MD-048)**, aquatic life uses are fully supported; however there is a significant increasing trend in total suspended solids and diethyl phthalate was detected in 1994. In sediments, di-n-butylphthalate was detected in the 1995 sample. Also in sediments, mercury exceeded the Effects Range Low (ERL) concentration, but was less than Effects Range Median (ERM) concentration. Recreational uses are fully supported.

Ashley River (MD-034) - Aquatic life uses are fully supported. There is a significant decreasing trend in pH. A significant decreasing trend in total nitrogen concentrations suggests improving conditions for this parameter. Recreational uses are fully supported.

Shem Creek (MD-071) - Aquatic life uses are partially supported due to dissolved oxygen excursions, compounded by a significant decreasing trend in dissolved oxygen concentrations. A significant decreasing trend in total nitrogen concentrations suggests improving conditions for this parameter. Recreational uses are not supported due to fecal coliform bacteria excursions, compounded by a significant increasing trend in fecal coliform bacteria concentrations.

Kiawah River (MD-207) - Aquatic life uses are fully supported; however there is a significant increasing trend in turbidity. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. Recreational uses are fully supported.

Stono River - Water quality at this site is influenced by water entering from Charleston Harbor on the rising tide. There are three monitoring sites along this section of the Stono River and recreational uses are fully supported at all sites. At the upstream site ***(MD-026)***, aquatic life uses are partially supported due to dissolved oxygen excursions. In addition, there was a significant decreasing trend in dissolved oxygen concentrations and a significant increasing trend in turbidity. There is also a significant decreasing trend in pH. Significant decreasing trends in five-day biochemical oxygen demand and total nitrogen concentrations suggest improving conditions for these parameters. In sediments, a high concentration of zinc was measured in 1994, and high concentrations of chromium and lead were measured in 1996. Sediment lead concentrations in 1995, 1996, and 1997 all exceeded the Effects Range Low concentration (ERL), but were less than Effects Range Median (ERM) concentration.

Further downstream ***(MD-206)***, aquatic life uses are not supported due to dissolved oxygen excursions, compounded by a significant increasing trend in turbidity. A significant decreasing trend in five-day biochemical oxygen demand suggests improving conditions for this parameter. At the furthest downstream site ***(MD-208)***, aquatic life uses are fully supported; however there is a significant increasing trend in turbidity.

NPDES Program

Active NPDES Facilities

RECEIVING STREAM ***FACILITY NAME*** ***PERMITTED FLOW @ PIPE (MGD)*** ***COMMENT***	***NPDES#*** ***TYPE*** ***LIMITATION***
CHARLESTON HARBOR MT PLEASANT WTP #1 PIPE #: 001 FLOW: M/R	SC0043265 MINOR DOMESTIC EFFLUENT
CHARLESTON HARBOR MT PLEASANT WTP #3 PIPE #: 001 FLOW: M/R	SC0043869 MINOR DOMESTIC EFFLUENT
CHARLESTON HARBOR MT PLEASANT/CENTER ST. PIPE #: 001 FLOW: 6.7 PIPE #: 002,003 FLOW: M/R	SC0040771 MAJOR DOMESTIC EFFLUENT
CHARLESTON HARBOR CHARLESTON CPW/PLUM ISLAND PIPE #: 001 FLOW: 27.0	SC0021229 MAJOR DOMESTIC EFFLUENT
CHARLESTON HARBOR FORT SUMTER NATL. MONUMENT PIPE #: 001 FLOW: M/R	SC0047147 MINOR INDUSTRIAL EFFLUENT
COVE CREEK TOWN OF SULLIVANS ISLAND WWTP PIPE #: 001 FLOW: 0.57	SC0020052 MINOR DOMESTIC EFFLUENT

FOLLY CREEK TRIBUTARY	SCG130001
ATLANTIC LITTLENECK CLAM FARM	MINOR INDUSTRIAL
PIPE #: 001,002,003 FLOW: M/R	WQL FOR BOD_5, NH3-N, DO, FC
(PERMIT INACTIVATED)	

Nonpoint Source Management Program

Camping Facilities

FACILITY NAME/TYPE	***PERMIT #***
RECEIVING STREAM	***STATUS***
ST CHRISTOPHER CAMP/RESIDENT	10-305-0009
KIAWAH RIVER	ACTIVE

Mining Activities

MINING COMPANY	***PERMIT #***
MINE NAME	***MINERAL***
CHARLESTON COUNTY	0314-19
KINSEY-BLAKE BORROW PIT	SAND/CLAY
DIRTCO	0512-19
MURRAY WOODS PIT	SAND/CLAY
ISLAND CONSTRUCTION CO.,INC.	0660-19
TREMONT MINE	SAND
LOWCOUNTRY DIRT, INC.	1005-19
BATTERY ISLAND MINE	SAND
TRULUCK CONSTRUCTION CO.	0687-19
EXCHANGE LANDING MINE	SAND
THREE OAKS LANDSCAPE NURSERY, INC.	0788-19
BURNIN ACRES MINE	SAND
THREE OAKS CONTRACTORS, INC.	1129-19
CHICKEN FARM MINE	SAND

Land Disposal Activities

Land Application Sites

LAND APPLICATION SYSTEM	***PERMIT #***
FACILITY NAME	***TYPE***
SPRAY ON GOLF COURSE	ND0017361
KIAWAH ISLAND	DOMESTIC

Landfill Facilities

SOLID WASTE LANDFILL NAME	***PERMIT #***
FACILITY TYPE	***STATUS***
TOWN OF SULLIVANS ISLAND	-------
MUNICIPAL	CLOSED

Growth Potential

There is a high potential for growth in this watershed. Suburban growth areas include: the Dills Property, Ellis Property II, Stiles Point Plantation, Stonefield, Fort Lamar, Grimbel Shores, and Harborwoods III on James Island; and Kiawah Island, Andell Property, and Hope Plantation on Johns Island. All growth areas in the watershed have water and sewer services available.

Watershed Protection and Restoration

Special Projects

Charleston Harbor Project

For the past five years, the Charleston Harbor Project has been conducting hundreds of experiments and studies in an effort to come up with a Special Area Management Plan for the Charleston Harbor. The primary goals of the Harbor Project are simple: to maintain and enhance the quality of the environment in the Charleston Harbor estuary system, to maintain the wide range of water uses and natural resources of the systems; and to anticipate and address potential problems before adverse impacts occur. The reason to address these issues now is clear: If you do not take steps to save the harbor, it will cost a lot more in the future. For example, Boston Harbor is now in an 11-year cleanup program. The cleanup program is estimated to cost between $3.5 and $4 billion. Tampa Bay has been trying to clean up its harbor after years of neglect. So far, it has run up a price tag of $2.5 billion. Continuing expenditures are estimated at more than $200 million per year. In 1999, the Charleston Harbor Project will submit a final report on what needs to be done to protect the Charleston Harbor.

The Charleston Harbor Models

Two different models have been developed for wasteload allocations purposes for the Charleston Harbor system. The initial model was developed through the Charleston Harbor Project (CHP) and the second model was developed by Applied Technologies and Management (ATM) for the Cooper River Water Users Association. Working in conjunction with the Department, the University of South Carolina, Clemson University, and the United States Geological Survey (USGS), CHP s goal was to develop a tool for the Department's use in point source wasteload allocation and Total Maximum Daily Load (TMDL) determination. The modeled domain, for both models, encompasses the Cooper River and its major tributaries from Pinopolis Dam to its confluence with the Wando River, the Wando River from its headwaters to the confluence with the Cooper River, and the Ashley River from Bacon Bridge downstream to the U.S. Hwy. 17 Bridge. Hydrodynamics, for CHP s effort, are modeled using the one-dimensional BRANCH model while water quality is modeled using the one-dimensional Branched Lagrangian Transport Model. Modeling data were collected in May and August of 1993 by the Department and the USGS. Hydrodynamics, for ATM s effort, are modeled using the two-dimensional boundary fitted circulation model. Water quality is modeled using the two dimensional WQMAP which

uses EPA WASP5 eutrophication model kinetics. Modeling data were collected in September 1996 by ATM and August of 1993 by the Department and the USGS. The Department plans on using the two models in concert to determine TMDL and point source wasteload allocations for the Charleston Harbor system.

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APPENDIX A.

Santee River Basin

Ambient Water Quality Monitoring Site Descriptions

Station #	Type	Class	Description
03050111-010			
SC-056	SC	FW	DRAINAGE FROM SAFETY KLEEN SEDIMENTATION POND B
SC-057	SC	FW	DRAINAGE FROM SAFETY KLEEN SEDIMENTATION POND A
SC-058	SC	FW	STREAM OFFSITE, SAFETY KLEEN PINEWOOD
SC-005	SC	FW	LAKE MARION APPROX 0.9 MI NW OF RIMINI RR TRESTLE
SC-004	SC	FW	SANTEE RIVER 0.1 MI UPSTREAM OF BROADWATER CREEK
SC-008	SC	FW	SANTEE R. AT RIMINI RR TRESTLE 3.1 MI N OF LONE STAR
SC-009	SC	FW	SPRING GROVE CREEK AT S-14-26
SC-038	SC	FW	LAKE MARION AT MOUTH OF HALFWAY SWAMP CREEK
SC-006	C	FW	WARLEY CREEK AT SC 267
SC-039	SC	FW	LAKE MARION 1.25 MI SE OF RIMINI RR TRESTLE
SC-010	SC	FW	LAKE MARION AT CHANNEL MARKER 150
SC-044	SC	FW	LAKE MARION BETWEEN STUMPHOLE LANDING AND TREE LINE
SC-011	SC	FW	BIG POPLAR CREEK AT S-38-105
SC-012	SC	FW	LAKE MARION 0.6 MI SW OF JACKS CREEK EMBAYMENT
SC-045	SC	FW	UNNAMED STREAM FROM POND ON SANTEE NATL GOLF COURSE
SC-014	SC	FW	LAKE MARION AT HEADWATERS OF CHAPEL BR FLOODED CREEK
ST-025	P	FW	LAKE MARION AT OLD US 301/15 BRIDGE AT SANTEE
SC-015	SC	FW	LAKE MARION AT OLD US 301/15 BRIDGE AT SANTEE
SC-042	SC	FW	LAKE MARION 0.5 MI W OF I-95/US 301 BRIDGE
SC-040	SC	FW	LAKE MARION AT USFWS CHANNEL MARKER 79
SC-041	SC	FW	LAKE MARION 2 MI N OF USFWS CHANNEL MARKER 79
SC-016	SC	FW	LAKE MARION AT USFWS CHANNEL MARKER 69
SC-036	SC	FW	LAKE MARION O.4 MI S OF TAWCAW CREEK EMBAYMENT
SC-021	SC	FW	LAKE MARION 0.9 MI NE OF ROCKS POND CAMPGROUND
SC-022	SC	FW	LAKE MARION AT CHANNEL MARKER 44
SC-019	SC	FW	LAKE MARION, MIDSTREAM OF POTATO CREEK EMBAYMENT
ST-024	P	FW	LAKE MARION, POTATO CK ARM AT CAMP BOB COOPER
SC-023	SC	FW	LAKE MARION, MIDSTREAM OF WYBOO CREEK EMBAYMENT
SC-035	SC	FW	LAKE MARION AT MOUTH OF WYBOO CREEK
03050111-020			
C-058	S	FW	LAKE INSPIRATION - ST MATTHEWS (FRONT OF HEALTH DEPT)
C-063	S	FW	HALFWAY SWAMP CREEK AT S-09-43 3 MI E OF ST MATTHEWS
SC-007	SC	FW	HALFWAY SWAMP CREEK AT SC 33
CW-241	W	FW	HALFWAY SWAMP CREEK AT S-09-72
CW-242	W	FW	HALFWAY SWAMP CREEK TRIBUTARY AT S-09-158
03050111-030			
CW-243	W	FW	BIG BRANCH AT S-14-41
CW-244	W	FW	JACKS CREEK AT S-14-76
SC-013	SC	FW	JACKS CREEK AT S-14-76

03050111-040			
ST-018	S	FW	TAWCAW CREEK AT S-14-127 3.2 MI S OF SUMMERTON
SC-018	SC	FW	TAWCAW CREEK AT S-14-127 3.2 MI S OF SUMMERTON
SC-017	SC	FW	LAKE MARION, MIDSTREAM OF TAWCAW EMBAYMENT
03050111-050			
SC-020	SC	FW	POTATO CREEK AT S-14-127
03050112-010			
SC-024	SC	FW	SANTEE RIVER AT WILSONS LANDING
ST-016	P	FW	SANTEE RIVER AT US 52 6.5 MI NNW OF ST STEPHENS
03050112-020			
SC-037	SC	FW	REDIVERSION CANAL AT SC 45
ST-031	P	FW	REDIVERSION CANAL AT US 52
03050112-030			
ST-001	P	FW	SANTEE RIVER AT SC 41/US 17A NE OF JAMESTOWN
03050112-050			
CSTL-112	W	FW	WAMBAW CREEK AT EXT. OF S-10-857
03050112-060			
ST-005	S	FW/SA	NORTH SANTEE RIVER AT US 17
ST-006	P	FW/SA	SOUTH SANTEE RIVER AT US 17

Water Quality Data

Spreadsheet Legend

Station Information:

STATION NUMBER Station ID

TYPE SCDHEC station type code

P = Primary station, sampled monthly all year round

S = Secondary station, sampled monthly May - October

P* = Secondary station upgraded to primary station parameter coverage and sampling frequency for basin study

W = Special watershed station added for the Santee River Basin study

BIO = Indicates macroinvertebrate community data assessed

WATERBODY NAME Stream or Lake Name

CLASS Stream classification at the point where monitoring station is located

Parameter Abbreviations and Parameter Measurement Units:

DO	Dissolved Oxygen (mg/l)	NH3	Ammonia (mg/l)
BOD	Five-Day Biochemical Oxygen Demand (mg/l)	CD	Cadmium (ug/l)
pH	pH (SU)	CR	Chromium (ug/l)
TP	Total Phosphorus (mg/l)	CU	Copper (ug/l)
TN	Total Nitrogen (mg/l)	PB	Lead (ug/l)
TURB	Turbidity (NTU)	HG	Mercury (ug/l)
TSS	Total Suspended Solids (mg/l)	NI	Nickel (ug/l)
BACT	Fecal Coliform Bacteria (#/100 ml)	ZN	Zinc (ug/l)

Statistical Abbreviations:

N For standards compliance, number of surface samples collected between January, 1994 and December, 1998.
For trends, number of surface samples collected between January, 1984 and December, 1998.
For total phosphorus, an additional trend period of January, 1992 to December, 1998 is also reported.

EXC. Number of samples contravening the appropriate standard

% Percentage of samples contravening the appropriate standard

MEAN EXC. Mean of samples which contravened the applied standard

MED For heavy metals with a human health criterion, this is the median of all surface samples between January, 1994 and December, 1998. DL indicates that the median was the detection limit.

MAG Magnitude of any statistically significant trend, average change per year, expressed in parameter measurement units

GEO MEAN Geometric mean of fecal coliform bacteria samples collected between January, 1994 and December, 1998

Key to Trends:

D Statistically significant decreasing trend in parameter concentration

I Statistically significant increasing trend in parameter concentration

* No statistically significant trend

Blank Insufficient data to test for long term trends

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	DO	DO	DO	MEAN	TRENDS (84-98)						pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG	N	EXC.	%	EXC.	PH	N	MAG
03050111010																				
SC-056	SC	UNNAMED CK FROM GSX	FW	56	0	0								56	46	82	5.35			
SC-057	SC	UNNAMED CK FROM GSX	FW	56	0	0								56	5	9	6.53			
SC-058	SC	UNNAMED CK FROM GSX	FW	56	1	2	3							56	18	32	5.683			
SC-005	SC	LAKE MARION	FW	40	14	35	3.768							40	2	5	5.805			
SC-004	SC	SANTEE RIVER	FW	50	0	0								50	3	6	5.9			
SC-008	SC	SANTEE RIVER	FW	50	1	2	4.89							50	3	6	5.86			
SC-009	SC	SPRING GROVE CK	FW	28	1	4	4.98							27	6	22	5.822			
SC-038	SC	LAKE MARION	FW	39	2	5	3.35							39	2	5	5.65			
SC-039	SC	LAKE MARION	FW	40	6	15	3.623							40	3	8	5.743			
SC-010	SC	LAKE MARION	FW	45	0	0								45	2	4	6.98			
SC-044	SC	LAKE MARION	FW	38	1	3	3.8							38	4	11	5.752			
SC-011	SC	BIG POPLAR CR	FW	29	9	31	3.377							28	1	4	5.9			
SC-012	SC	LAKE MARION	FW	44	0	0								43	2	5	5.85			
SC-045	SC	UNNAMED STREAM	FW	43	3	7	3.49							42	2	5	5.65			
SC-014	SC	CHAPEL BRANCH CK	FW	49	0	0								48	3	6	8.707			
ST-025	P	LAKE MARION	FW	60	0	0		*	176		D	174	-0.1	60	4	7	8.725	D	175	-0.052
SC-015	SC	LAKE MARION	FW	49	0	0								48	1	2	5.4			
SC-042	SC	LAKE MARION	FW	40	0	0								40	2	5	8.9			
SC-040	SC	LAKE MARION	FW	47	0	0								46	3	7	6.667			
SC-041	SC	LAKE MARION	FW	36	0	0								37	2	5	8.65			
SC-016	SC	LAKE MARION	FW	40	0	0								40	2	5	7.3			
SC-036	SC	LAKE MARION	FW	45	0	0								44	0	0				
SC-021	SC	LAKE MARION	FW	45	0	0								44	0	0				
SC-022	SC	LAKE MARION	FW	43	0	0								42	0	0				
CSTL-079	P	DIVERSION CANAL	FW	55	1	2	4.5	D	165	-0.07	D	164	-0.063	55	1	2	8.74	D	164	-0.023
SC-025	SC	DIVERSION CANAL	FW	55	0	0								55	5	9	5.804			
03050111020																				
SC-006	SC	WARLEY CR	FW	29	0	0								28	2	7	5.405			
C-058	S	LAKE INSPIRATION	FW	28	6	21	3.275	D	69	-0.15	*	60		28	4	14	8.305	D	68	-0.087
C-063	S*	HALFWAY SWAMP CK	FW	29	0	0		*	76		D	68	-0.04	29	3	10	5.6	D	76	-0.033
SC-007	SC	HALFWAY SWAMP CR	FW	30	0	0								29	3	10	5.717			
CW-241	CS	HALFWAY SWAMP CK	FW	8	0	0								8	0	0				
CW-242	I*	UNNAMED TRIB	FW	6	1	17	4.1							6	0	0				

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050111010																		
SC-056	SC	UNNAMED CK FROM GSX	FW															
SC-057	SC	UNNAMED CK FROM GSX	FW															
SC-058	SC	UNNAMED CK FROM GSX	FW															
SC-005	SC	LAKE MARION	FW															
SC-004	SC	SANTEE RIVER	FW															
SC-008	SC	SANTEE RIVER	FW															
SC-009	SC	SPRING GROVE CK	FW															
SC-038	SC	LAKE MARION	FW															
SC-039	SC	LAKE MARION	FW															
SC-010	SC	LAKE MARION	FW															
SC-044	SC	LAKE MARION	FW															
SC-011	SC	BIG POPLAR CR	FW															
SC-012	SC	LAKE MARION	FW															
SC-045	SC	UNNAMED STREAM	FW															
SC-014	SC	CHAPEL BRANCH CK	FW															
ST-025	P	LAKE MARION	FW	*	75		*	166		*	163		*	175				
SC-015	SC	LAKE MARION	FW															
SC-042	SC	LAKE MARION	FW															
SC-040	SC	LAKE MARION	FW															
SC-041	SC	LAKE MARION	FW															
SC-016	SC	LAKE MARION	FW															
SC-036	SC	LAKE MARION	FW															
SC-021	SC	LAKE MARION	FW															
SC-022	SC	LAKE MARION	FW															
CSTL-079	P	DIVERSION CANAL	FW	*	68		D	157	-0.0022	D	155	-0.006	*	164				
SC-025	SC	DIVERSION CANAL	FW															
03050111020																		
SC-006	SC	WARLEY CR	FW															
C-058	S	LAKE INSPIRATION	FW				*	60					*	62				
C-063	S*	HALFWAY SWAMP CK	FW				*	68					*	70				
SC-007	SC	HALFWAY SWAMP CR	FW															
CW-241	CS	HALFWAY SWAMP CK	FW															
CW-242	I*	UNNAMED TRIB	FW															

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050111010																	
SC-056	SC	UNNAMED CK FROM GSX	FW	122	1	0	0					52	0				
SC-057	SC	UNNAMED CK FROM GSX	FW	102	1	0	0					52	0				
SC-058	SC	UNNAMED CK FROM GSX	FW		0	0	0					52	0				
SC-005	SC	LAKE MARION	FW	5.13	37	0	0					38	0				
SC-004	SC	SANTEE RIVER	FW	36.74	47	1	2	600				44	0				
SC-008	SC	SANTEE RIVER	FW	26.61	47	2	4	565				44	0				
SC-009	SC	SPRING GROVE CK	FW	195.21	27	6	22	657				25	0				
SC-038	SC	LAKE MARION	FW	10.51	36	1	3	488				36	0				
SC-039	SC	LAKE MARION	FW	3.52	37	0	0					37	0				
SC-010	SC	LAKE MARION	FW	7.32	45	1	2	448				42	0				
SC-044	SC	LAKE MARION	FW	4.97	35	0	0					37	0				
SC-011	SC	BIG POPLAR CR	FW	37.65	28	2	7	810				25	0				
SC-012	SC	LAKE MARION	FW	3.37	43	0	0					41	0				
SC-045	SC	UNNAMED STREAM	FW	11.92	40	2	5	1215				36	0				
SC-014	SC	CHAPEL BRANCH CK	FW	17.17	49	0	0					43	0				
ST-025	P	LAKE MARION	FW	26.65	59	1	2	600	I	174	0.666666	58	0	21	0	DL	0
SC-015	SC	LAKE MARION	FW	5.47	46	0	0					43	0				
SC-042	SC	LAKE MARION	FW	2.55	43	0	0					38	0				
SC-040	SC	LAKE MARION	FW	4.41	45	0	0					42	0				
SC-041	SC	LAKE MARION	FW	2.27	40	0	0					35	0				
SC-016	SC	LAKE MARION	FW	2.16	38	0	0					38	0				
SC-036	SC	LAKE MARION	FW	1.61	42	0	0					40	0				
SC-021	SC	LAKE MARION	FW	1.84	43	0	0					40	0				
SC-022	SC	LAKE MARION	FW	1.25	39	0	0					38	0				
CSTL-079	P	DIVERSION CANAL	FW	5.5	55	0	0		D	159	-0.1	53	0	19	0	DL	0
SC-025	SC	DIVERSION CANAL	FW	6.41	52	2	4	600				52	0				
03050111020																	
SC-006	SC	WARLEY CR	FW	150.37	28	5	18	876				25	0				
C-058	S	LAKE INSPIRATION	FW	41.13	26	4	15	11762.5	D	63	-3.6						
C-063	S*	HALFWAY SWAMP CK	FW	535.51	28	19	68	1076	*	70		4	0	3	0	DL	0
SC-007	SC	HALFWAY SWAMP CR	FW	141.55	28	8	29	7.8				24	0				
CW-241	CS	HALFWAY SWAMP CK	FW	239.82	7	2	29	1100				6	0	1	0	DL	0
CW-242	I*	UNNAMED TRIB	FW	128.35	5	1	20	1800				5	0	1	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	CR N	CR EXC.	CR MED.	CR %	CU N	CU EXC.	CU %	PB N	PB EXC.	PB MED.	PB %	HG N	HG EXC.	HG MED.	HG %
03050111010																		
SC-056	SC	UNNAMED CK FROM GSX	FW															
SC-057	SC	UNNAMED CK FROM GSX	FW															
SC-058	SC	UNNAMED CK FROM GSX	FW															
SC-005	SC	LAKE MARION	FW															
SC-004	SC	SANTEE RIVER	FW															
SC-008	SC	SANTEE RIVER	FW															
SC-009	SC	SPRING GROVE CK	FW															
SC-038	SC	LAKE MARION	FW															
SC-039	SC	LAKE MARION	FW															
SC-010	SC	LAKE MARION	FW															
SC-044	SC	LAKE MARION	FW															
SC-011	SC	BIG POPLAR CR	FW															
SC-012	SC	LAKE MARION	FW															
SC-045	SC	UNNAMED STREAM	FW															
SC-014	SC	CHAPEL BRANCH CK	FW															
ST-025	P	LAKE MARION	FW	21	0	DL	0	21	2	10	21	0	DL	0	20	0	DL	0
SC-015	SC	LAKE MARION	FW															
SC-042	SC	LAKE MARION	FW															
SC-040	SC	LAKE MARION	FW															
SC-041	SC	LAKE MARION	FW															
SC-016	SC	LAKE MARION	FW															
SC-036	SC	LAKE MARION	FW															
SC-021	SC	LAKE MARION	FW															
SC-022	SC	LAKE MARION	FW															
CSTL-079	P	DIVERSION CANAL	FW	19	0	DL	0	19	1	5	19	0	DL	0	19	0	DL	0
SC-025	SC	DIVERSION CANAL	FW															
03050111020																		
SC-006	SC	WARLEY CR	FW															
C-058	S	LAKE INSPIRATION	FW															
C-063	S*	HALFWAY SWAMP CK	FW	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
SC-007	SC	HALFWAY SWAMP CR	FW															
CW-241	CS	HALFWAY SWAMP CK	FW	1	0	DL	0	1	0	0	1	0	DL	0	1	0	DL	0
CW-242	I*	UNNAMED TRIB	FW	1	0	DL	0	1	0	0	1	0	DL	0	1	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050111010									
SC-056	SC	UNNAMED CK FROM GSX	FW						
SC-057	SC	UNNAMED CK FROM GSX	FW						
SC-058	SC	UNNAMED CK FROM GSX	FW						
SC-005	SC	LAKE MARION	FW						
SC-004	SC	SANTEE RIVER	FW						
SC-008	SC	SANTEE RIVER	FW						
SC-009	SC	SPRING GROVE CK	FW						
SC-038	SC	LAKE MARION	FW						
SC-039	SC	LAKE MARION	FW						
SC-010	SC	LAKE MARION	FW						
SC-044	SC	LAKE MARION	FW						
SC-011	SC	BIG POPLAR CR	FW						
SC-012	SC	LAKE MARION	FW						
SC-045	SC	UNNAMED STREAM	FW						
SC-014	SC	CHAPEL BRANCH CK	FW						
ST-025	P	LAKE MARION	FW	21	0	0	20	0	0
SC-015	SC	LAKE MARION	FW						
SC-042	SC	LAKE MARION	FW						
SC-040	SC	LAKE MARION	FW						
SC-041	SC	LAKE MARION	FW						
SC-016	SC	LAKE MARION	FW						
SC-036	SC	LAKE MARION	FW						
SC-021	SC	LAKE MARION	FW						
SC-022	SC	LAKE MARION	FW						
CSTL-079	P	DIVERSION CANAL	FW	18	0	0	19	0	0
SC-025	SC	DIVERSION CANAL	FW						
03050111020									
SC-006	SC	WARLEY CR	FW						
C-058	S	LAKE INSPIRATION	FW						
C-063	S*	HALFWAY SWAMP CK	FW	3	0	0	3	0	0
SC-007	SC	HALFWAY SWAMP CR	FW						
CW-241	CS	HALFWAY SWAMP CK	FW	1	0	0	1	1	100
CW-242	I*	UNNAMED TRIB	FW	1	0	0	1	0	0

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST		DO	DO	DO	MEAN	TRENDS (84-98)							pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS		N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG		N	EXC.	%	EXC.	PH	N	MAG
03050111030																						
CW-243	CS	BIG BRANCH	FW		8	6	75	2.35								8	3	38	5.853			
CW-244	CS	JACKS CK	FW		8	1	13	4.85								8	0	0				
SC-013	SC	JACKS CK	FW		29	0	0									28	1	4	5.6			
03050111040																						
ST-018	P*	TAWCAW CK	FW		26	10	38	2.59	*	91		*	89			26	1	4	5.3	*	90	
SC-018	SC	TAWCAW CK	FW		29	1	3	4.5								28	1	4	5.9			
SC-017	SC	LAKE MARION	FW		46	0	0									46	1	2	5.3			
03050111050																						
SC-020	SC	POTATO CK	FW		28	1	4	4.24								27	1	4	5.9			
SC-019	SC	LAKE MARION	FW		47	0	0									46	2	4	9.09			
ST-024	P	LAKE MARION	FW		58	0	0		D	175	-0.06	D	173	-0.033		57	0	0		*	172	
SC-023	SC	LAKE MARION	FW		47	0	0									46	0	0				
SC-035	SC	LAKE MARION	FW		46	0	0									46	4	9	8.772			
03050112010																						
SC-024	SC	SANTEE RVR	FW		56	2	4	4.8								55	2	4	5.85			
ST-016	P	SANTEE RVR	FW		57	2	4	3.575	*	163		D	163	-0.054		57	0	0		*	163	
03050112020																						
SC-037	SC	REDIVERSION CANAL	FW		55	0	0									54	4	7	5.695			
ST-031	P	REDIVERSION CANAL	FW		54	0	0		D	79	-0.15	*	79			54	3	6	7.787	I	78	0.06533
03050112030																						
ST-001	P	SANTEE RVR	FW		59	8	14	4.024	D	169	-0.05	D	164	-0.066		59	2	3	7.69	*	167	
03050112050																						
CSTL-112	CS	WAMBAW CK	FW		6	3	50	3.233								6	0	0				
03050112060																						
ST-005	P*	N SANTEE RVR	FW		30	3	10	4.437	*	80		D	80	-0.066		30	2	7	5.905	*	80	
ST-005	P*	N SANTEE RVR	SA		30	3	10	4.437	*	80		D	80	-0.066		30	5	17	6.162	*	80	
ST-006	P	S SANTEE RVR	FW		59	2	3	4.18	D	168	-0.038	D	166	-0.085		59	2	3	7.41	*	167	
ST-006	P	S SANTEE RVR *	SA		59	2	3	4.18	D	168	-0.038	D	166	-0.085		59	7	12	6.641	*	167	

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050111030																		
CW-243	CS	BIG BRANCH	FW															
CW-244	CS	JACKS CK	FW															
SC-013	SC	JACKS CK	FW															
03050111040																		
ST-018	P*	TAWCAW CK	FW	I	41	0.0067	*	88					*	89				
SC-018	SC	TAWCAW CK	FW															
SC-017	SC	LAKE MARION	FW															
03050111050																		
SC-020	SC	POTATO CK	FW															
SC-019	SC	LAKE MARION	FW															
ST-024	P	LAKE MARION	FW	D	75	0	D	169	-0.0024	D	165	-0.01	I	174	0.05			
SC-023	SC	LAKE MARION	FW															
SC-035	SC	LAKE MARION	FW															
03050112010																		
SC-024	SC	SANTEE RVR	FW															
ST-016	P	SANTEE RVR	FW	*	71		D	160	0.0008	D	158	-0.006	I	163	0.16			
03050112020																		
SC-037	SC	REDIVERSION CANAL	FW															
ST-031	P	REDIVERSION CANAL	FW	*	67		*	73		*	73		I	78	0.345			
03050112030																		
ST-001	P	SANTEE RVR	FW	*	71		D	159	-0.0023	D	159	-0.0157	*	162		*	155	
03050112050																		
CSTL-112	CS	WAMBAW CK	FW															
03050112060																		
ST-005	P*	N SANTEE RVR	FW	*	35		D	76	-0.0033				D	80	-1			
ST-005	P*	N SANTEE RVR	SA	*	35		D	76	-0.0033				D	80	-1			
ST-006	P	S SANTEE RVR	FW	*	69		D	157	-0.0025	D	156	-0.022	D	165	-0.4272			
ST-006	P	S SANTEE RVR *	SA	*	69		D	157	-0.0025	D	156	-0.022	D	165	-0.4272			

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050111030																	
CW-243	CS	BIG BRANCH	FW	250.87	8	2	25	1700				8	0	2	0	DL	0
CW-244	CS	JACKS CK	FW	131.17	8	1	13	740				8	0	2	0	DL	0
SC-013	SC	JACKS CK	FW	112.65	25	2	8	800				25	0				
03050111040																	
ST-018	P*	TAWCAW CK	FW	302.42	26	10	38	600	*	90		8	0	2	0	DL	0
SC-018	SC	TAWCAW CK	FW	166.67	27	8	30	1084				25	0				
SC-017	SC	LAKE MARION	FW	3.06	44	0	0					41	0				
03050111050																	
SC-020	SC	POTATO CK	FW	106.48	26	4	15	1165				24	0				
SC-019	SC	LAKE MARION	FW	1.93	44	0	0					42	0				
ST-024	P	LAKE MARION	FW	3.88	58	0	0		*	175		54	0	19	0	DL	0
SC-023	SC	LAKE MARION	FW	2.62	45	0	0					42	0				
SC-035	SC	LAKE MARION	FW	1.27	43	0	0					41	0				
03050112010																	
SC-024	SC	SANTEE RVR	FW	15.71	51	4	8	553				52	0				
ST-016	P	SANTEE RVR	FW	37.31	57	2	4	640	*	158		55	0	19	0	DL	0
03050112020																	
SC-037	SC	REDIVERSION CANAL	FW	6.77	50	0	0					51	0				
ST-031	P	REDIVERSION CANAL	FW	3.29	54	1	2	410	*	79		50	0	18	0	DL	0
03050112030																	
ST-001	P	SANTEE RVR	FW	49.31	57	1	2	710	*	160		56	0	18	0	DL	0
03050112050																	
CSTL-112	CS	WAMBAW CK	FW	69.19	6	0	0					6	0	2	0	DL	0
03050112060																	
ST-005	P*	N SANTEE RVR	FW	40.91	29	1	3	610	*	77							
ST-005	P*	N SANTEE RVR	SA						*	77							
ST-006	P	S SANTEE RVR	FW	72.66	59	3	5	1370	*	84		57	0	17	0	DL	0
ST-006	P	S SANTEE RVR *	SA	72.66	59	3	5	1370	*	84		57	0	17	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	CR N	CR EXC.	CR MED.	CR %	CU N	CU EXC.	CU %	PB N	PB EXC.	PB MED.	PB %	HG N	HG EXC.	HG MED.	HG %
03050111030																		
CW-243	CS	BIG BRANCH	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
CW-244	CS	JACKS CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
SC-013	SC	JACKS CK	FW															
03050111040																		
ST-018	P*	TAWCAW CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
SC-018	SC	TAWCAW CK	FW															
SC-017	SC	LAKE MARION	FW															
03050111050																		
SC-020	SC	POTATO CK	FW															
SC-019	SC	LAKE MARION	FW															
ST-024	P	LAKE MARION	FW	19	0	DL	0	19	1	5	19	0	DL	0	19	0	DL	0
SC-023	SC	LAKE MARION	FW															
SC-035	SC	LAKE MARION	FW															
03050112010																		
SC-024	SC	SANTEE RVR	FW															
ST-016	P	SANTEE RVR	FW	19	0	DL	0	19	0	0	19	0	DL	0	19	0	DL	0
03050112020																		
SC-037	SC	REDIVERSION CANAL	FW															
ST-031	P	REDIVERSION CANAL	FW	18	0	DL	0	18	1	6	18	0	DL	0	17	0	DL	0
03050112030																		
ST-001	P	SANTEE RVR	FW	18	0	DL	0	18	0	0	18	0	DL	0	18	0	DL	0
03050112050																		
CSTL-112	CS	WAMBAW CK	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050112060																		
ST-005	P*	N SANTEE RVR	FW															
ST-005	P*	N SANTEE RVR	SA															
ST-006	P	S SANTEE RVR	FW	17	2	DL	12	17	0	0	17	0	DL	0	17	0	DL	0
ST-006	P	S SANTEE RVR *	SA	17	0	DL	0	17	0	0	17	0	DL	0	17	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050111030									
CW-243	CS	BIG BRANCH	FW	2	0	0	2	0	0
CW-244	CS	JACKS CK	FW	2	0	0	2	0	0
SC-013	SC	JACKS CK	FW						
03050111040									
ST-018	P*	TAWCAW CK	FW	2	0	0	2	0	0
SC-018	SC	TAWCAW CK	FW						
SC-017	SC	LAKE MARION	FW						
03050111050									
SC-020	SC	POTATO CK	FW						
SC-019	SC	LAKE MARION	FW						
ST-024	P	LAKE MARION	FW	18	0	0	19	2	11
SC-023	SC	LAKE MARION	FW						
SC-035	SC	LAKE MARION	FW						
03050112010									
SC-024	SC	SANTEE RVR	FW						
ST-016	P	SANTEE RVR	FW	19	0	0	19	0	0
03050112020									
SC-037	SC	REDIVERSION CANAL	FW						
ST-031	P	REDIVERSION CANAL	FW	18	0	0	18	0	0
03050112030									
ST-001	P	SANTEE RVR	FW	18	0	0	18	0	0
03050112050									
CSTL-112	CS	WAMBAW CK	FW	2	0	0	2	0	0
03050112060									
ST-005	P*	N SANTEE RVR	FW						
ST-005	P*	N SANTEE RVR	SA						
ST-006	P	S SANTEE RVR	FW	17	0	0	17	0	0
ST-006	P	S SANTEE RVR *	SA	17	0	0	17	0	0

APPENDIX B.

Cooper River/Ashley River Basin

Ambient Water Quality Monitoring Site Descriptions

Station #	Type	Class	Description
03050201-010			
CSTL-079	P	FW	DIVERSION CANAL AT SC 45 12.6 MI W OF ST STEPHENS
SC-025	SC	FW	DIVERSION CANAL AT SC 45 12.6 MI W OF ST STEPHENS
SC-043	SC	FW	LAKE MOULTRIE TRIB AT SE CORNER OF CROSS GENERATING STA.
SC-026	SC	FW	LAKE MOULTRIE TRIB 0.4 MI UPSTREAM OF SC 6
SC-027	SC	FW	LAKE MOULTRIE IN SW QUADRANT
SC-034	SC	FW	DUCK POND CREEK AT SC 6
SC-028	SC	FW	LAKE MOULTRIE IN NW QUADRANT
SC-029	SC	FW	LAKE MOULTRIE IN SOUTHERN QUADRANT
SC-030	SC	FW	LAKE MOULTRIE MID-POINT AT USFWS CHANNEL MARKER 17
SC-031	SC	FW	LAKE MOULTRIE IN NORTHERN QUADRANT
SC-046	SC	FW	LAKE MOULTRIE IN SE QUADRANT OF LAKE
SC-032	SC	FW	LAKE MOULTRIE IN SE QUADRANT AT USFWS CHANNEL MARKER 2
SC-033	SC	FW	TAILRACE CANAL AT DOCK RESTAURANT BOAT SLIP
CSTL-062	P	FW	TAIL RACE CANAL AT US 52 & 17A BELOW LAKE MOULTRIE
03050201-020			
ST-007	S	FW	WALKER SWAMP AT US 52 2.5 MI S ST STEPHENS
CSTL-113	W	FW	WADBOO CREEK AT SC 402
03050201-030			
CSTL-085	S	FW	PIER IN W. BR. COOPER R. AT END OF RICE MILL RD IN PIMLICO
03050201-050			
MD-043	P	SB	COOPER RIVER AT CHANNEL MARKER 72 NEAR USN AMMO DEPOT
MD-044	P	SB	COOPER R. BELOW MOUTH OF GOOSE CK AT CHANNEL BUOY 60
MD-249	P	SB	FILBIN CREEK AT VIRGINIA AVE, NORTH CHARLESTON
MD-248	P	SB	COOPER RIVER AT MARK CLARK BRIDGE (I-526)
MD-045	P	SB	COOPER RIVER UPSTREAM OF SHIPYARD CK AT CHANNEL BUOY 49
MD-243	P	SB	SHIPYARD CREEK BETWEEN MARKER #6 AND MCALLOY DOCK
MD-047	P	SB	TOWN CREEK (W SIDE OF DRUM ISL) UNDER GRACE MEM. BRIDGE
MD-046	P	SB	COOPER RIVER UNDER GRACE MEMORIAL BRIDGE
03050201-060			
MD-152	P	FW/SB	BACK RIVER AT S-08-503 6.2 MI ESE TOWN OF GOOSE CREEK
MD-217	P	FW	DURHAM CREEK AT S-08-9 BRIDGE
MD-240	P	FW	FOSTER CREEK AT CHARLESTON CPW WATER INTAKE
03050201-070			
MD-152	P	FW/SB	BACK RIVER AT S-08-503 6.2 MI ESE TOWN OF GOOSE CREEK
MD-217	P	FW	DURHAM CREEK AT S-08-9 BRIDGE
MD-240	P	FW	FOSTER CREEK AT CHARLESTON CPW WATER INTAKE

03050201-080			
MD-115	P	SFH	WANDO RIVER AT S.C. 41
MD-198	P	SFH/SA	WANDO RIVER BETWEEN RATHALL & HOBCAW CKS
03050202-010			
CSTL-063	P	FW	WASSAMASSAW SWAMP AT U.S. 176
CSTL-078	W	FW	CYPRESS SWAMP AT U.S. 78
03050202-020			
CSTL-102	P	FW/SA	ASHLEY RIVER AT SC 165 4.8 MI SSW OF SUMMERVILLE
03050202-030			
CSTL-043	S	FW	SAWMILL BRANCH AT SC 78 E OF SUMMERVILLE
CSTL-013	P	SA	DORCHESTER CREEK AT SC 165
CSTL-099	P	SB	EAGLE CREEK AT SC 642 5 MI SSE OF SUMMERVILLE
03050202-040			
MD-049	P	SA	ASHLEY RIVER AT MAGNOLIA GARDENS
MD-246	P	SA*	CHURCH CREEK MOUTH
MD-135	S	SA*	ASHLEY RIVER AT S.C. 7 (NORTH BRIDGE)
MD-052	P	SA	ASHLEY RIVER AT SAL RR BRIDGE
03050202-050			
MD-121	S	SFH	LOG BRIDGE CREEK AT SC 162
MD-202	P	SFH	STONO R. AT S-10-20 2 MI UPSTR OF CLEMSON EXP. STATION
MD-025	S	SFH	MOUTH OF ELLIOTT CUT AT EDGE WATER DR (S-10-26 OFF HW 17)
MD-020	P	SB	MOUTH OF WAPPOO CREEK BETW CHANNEL MARKERS 3 & 4
03050202-060			
MD-250	W	SFH	AWENDAW CREEK AT US 17
MD-203	P	SFH	JEREMY CK NEAR BOAT LANDING -MCCLELLANVILLE TOWN HALL
MD-069	P	SB/SFH	AIWW AT SC 703 E MOUNT PLEASANT
03050202-070			
MD-026	P	SFH	STONO RIVER AT SC 700
MD-034	P	SA	RT BK OF ASHLEY R. BTWN MOUTH OF JAMES IS. CK & DILL CK
MD-165	P	SB	CHARLESTON HARBOR AT FT JOHNSON PIER AT MARINE SCI LAB
MD-048	P	SB	S.CHANNEL CHAS HARBOR OFF FT JOHNSON STA BELL BUOY 28
MD-247	P	SB	CHARLESTON HARBOR NEAR MT. PLEASANT WWTP DIFFUSER
MD-071	P	SB	SHEM CREEK AT BRIDGE ON US 17
MD-206	S	SFH	STONO RIVER AT ABBAPOOLA CREEK
MD-207	S	SFH	KIAWAH RIVER MOUTH AT STONO RIVER
MD-208	S	SFH	STONO RIVER MOUTH AT BUOY 10 OFF SANDY POINT

Water Quality Data

Spreadsheet Legend

Station Information:

STATION NUMBER Station ID

TYPE SCDHEC station type code

- P = Primary station, sampled monthly all year round
- S = Secondary station, sampled monthly May - October
- P* = Secondary station upgraded to primary station parameter coverage and sampling frequency for basin study
- W = Special watershed station added for the Santee River Basin study
- BIO = Indicates macroinvertebrate community data assessed

WATERBODY NAME Stream or Lake Name

CLASS Stream classification at the point where monitoring station is located

Parameter Abbreviations and Parameter Measurement Units:

DO	Dissolved Oxygen (mg/l)	NH3	Ammonia (mg/l)
BOD	Five-Day Biochemical Oxygen Demand (mg/l)	CD	Cadmium (ug/l)
pH	pH (SU)	CR	Chromium (ug/l)
TP	Total Phosphorus (mg/l)	CU	Copper (ug/l)
TN	Total Nitrogen (mg/l)	PB	Lead (ug/l)
TURB	Turbidity (NTU)	HG	Mercury (ug/l)
TSS	Total Suspended Solids (mg/l)	NI	Nickel (ug/l)
BACT	Fecal Coliform Bacteria (#/100 ml)	ZN	Zinc (ug/l)

Statistical Abbreviations:

N For standards compliance, number of surface samples collected between January, 1994 and December, 1998.
For trends, number of surface samples collected between January, 1984 and December, 1998.
For total phosphorus, an additional trend period of January, 1992 to December, 1998 is also reported.

EXC. Number of samples contravening the appropriate standard

% Percentage of samples contravening the appropriate standard

MEAN EXC. Mean of samples which contravened the applied standard

MED For heavy metals with a human health criterion, this is the median of all surface samples between January, 1994 and December, 1998. DL indicates that the median was the detection limit.

MAG Magnitude of any statistically significant trend, average change per year, expressed in parameter measurement units

GEO MEAN Geometric mean of fecal coliform bacteria samples collected between January, 1994 and December, 1998

Key to Trends:

D Statistically significant decreasing trend in parameter concentration

I Statistically significant increasing trend in parameter concentration

* No statistically significant trend

Blank Insufficient data to test for long term trends

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	DO	DO	DO	MEAN	TRENDS (84-98)						pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG	N	EXC.	%	EXC.	PH	N	MAG
03050201010																				
SC-043	SC	UNNAMED TRIB	FW	32	2	6	4.38							31	1	3	4.6			
SC-026	SC	UNNAMED TRIB	FW	21	0	0								22	1	5	5.7			
SC-027	SC	LAKE MOULTRIE	FW	49	0	0								50	1	2	8.6			
SC-034	SC	DUCKS POND CR	FW	13	3	23	3.45							14	9	64	5.567			
SC-028	SC	LAKE MOULTRIE	FW	48	0	0								49	2	4	7.45			
SC-029	SC	LAKE MOULTRIE	FW	18	0	0								18	0	0				
SC-030	SC	LAKE MOULTRIE	FW	50	0	0								51	0	0				
SC-031	SC	LAKE MOULTRIE	FW	49	0	0								50	1	2	5.9			
SC-046	SC	LAKE MOULTRIE	FW	32	0	0								32	1	3	5.9			
SC-032	SC	LAKE MOULTRIE	FW	50	0	0								50	1	2	5.79			
SC-033	SC	TAILRACE CANAL	FW	57	0	0								56	7	13	5.813			
CSTL-062	P	TAILRACE CANAL	FW	55	1	2	4.4	D	168	-0.05	D	167	-0.067	55	1	2	8.62	*	165	
03050201020																				
ST-007	S	WALKER SWAMP	FW	25	2	8	4.15	*	71		D	72	-0.071	25	0	0		*	72	
CSTL-113	CS	WADBOO SWAMP	FW	5	2	40	4.5							5	0	0				
03050201030																				
CSTL-085	P*	COOPER RVR	FW	28	2	7	4.15	*	78		D	74	-0.04	28	2	7	7.205	*	78	
MD-217	P	DURHAM CK	FW	56	5	9	4.05	*	152		D	148	-0.066	56	2	4	7.075	*	152	
03050201050																				
MD-152	P	COOPER RVR	FW	59	3	5	3.483	D	173	-0.05	D	147	-0.012	59	1	2	9.15	*	171	
MD-152	P	COOPER RVR	SB	59	1	2	0.8	D	173	-0.05	D	147	-0.012	59	1	2	9.15	*	171	
MD-043	P	COOPER RVR	SB	58	0	0		D	171	-0.05	D	150	-0.014	56	0	0		*	167	
MD-044	P	COOPER RVR	SB	56	0	0		D	180	-0.046	D	153	-0.022	57	0	0		D	180	-0.01
MD-249	P	FILBIN CK	SB	56	4	7	3.1	*	61		*	60		56	3	5	6.97	I	61	0.0675
MD-248	P	COOPER RVR	SB	53	0	0		*	58		D	51	-0.4	54	0	0		I	58	0.07
MD-045	P	COOPER RVR	SB	54	0	0		D	178	-0.035	D	151	-0.025	55	0	0		D	176	-0.008
MD-243	P	SHIPYARD CK	SB	53	1	2	0.6	I	100	0.1	D	89	-0.033	55	1	2	5.1	*	101	
MD-047	P	TOWN CK, COOPER RVR	SB	53	0	0		D	180	-0.043	*	155		55	0	0		D	179	-0.01
MD-046	P	COOPER RVR	SB	54	0	0		D	175	-0.05	D	150	-0.017	55	1	2	5.2	D	176	-0.009
03050201060																				
MD-240	P	FOSTER CK	FW	56	45	80	2.437	*	115		D	111	-0.08	56	3	5	6.857	I	115	0.05

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050201010																		
SC-043	SC	UNNAMED TRIB	FW															
SC-026	SC	UNNAMED TRIB	FW															
SC-027	SC	LAKE MOULTRIE	FW															
SC-034	SC	DUCKS POND CR	FW															
SC-028	SC	LAKE MOULTRIE	FW															
SC-029	SC	LAKE MOULTRIE	FW															
SC-030	SC	LAKE MOULTRIE	FW															
SC-031	SC	LAKE MOULTRIE	FW															
SC-046	SC	LAKE MOULTRIE	FW															
SC-032	SC	LAKE MOULTRIE	FW															
SC-033	SC	TAILRACE CANAL	FW															
CSTL-062	P	TAILRACE CANAL	FW	D	69	-0.0003	D	160	-0.0025	D	160	-0.009	*	167				
03050201020																		
ST-007	S	WALKER SWAMP	FW				D	68	-0.007				I	72	0.3125			
CSTL-113	CS	WADBOO SWAMP	FW															
03050201030																		
CSTL-085	P*	COOPER RVR	FW	*	32		D	71	-0.002				*	77				
MD-217	P	DURHAM CK	FW	*	72		D	144	-0.0025	D	142	-0.02	*	149				
03050201050																		
MD-152	P	COOPER RVR	FW	*	67		D	152	0	D	148	-0.0114	I	151	0.1519			
MD-152	P	COOPER RVR	SB	*	67		D	152	0	D	148	-0.0114	I	151	0.1519			
MD-043	P	COOPER RVR	SB	D	67	-0.0033	D	150	0	D	147	-0.01	I	151	0.1545			
MD-044	P	COOPER RVR	SB	*	77		D	162	0	D	160	-0.0175	I	154	0.1			
MD-249	P	FILBIN CK	SB	*	56		*	56		*	56		*	60				
MD-248	P	COOPER RVR	SB	D	54	-0.0135	D	54	-0.0132	D	54	-0.0883	D	52	-0.5			
MD-045	P	COOPER RVR	SB	*	77		D	161	-0.0011	D	159	-0.0175	I	152	0.0666			
MD-243	P	SHIPYARD CK	SB	D	67	-0.002	*	86		*	84		*	88		*	62	
MD-047	P	TOWN CK, COOPER RVR	SB	*	77		D	162	-0.0012	D	159	-0.015	*	155				
MD-046	P	COOPER RVR	SB	*	79		D	162	-0.0014	D	159	-0.014	I	150	0.1			
03050201060																		
MD-240	P	FOSTER CK	FW	I	70	0.004	*	105		*	102		*	113				

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050201010																	
SC-043	SC	UNNAMED TRIB	FW	42.9	30	5	17	734				29	0				
SC-026	SC	UNNAMED TRIB	FW	116.64	22	8	36	756				18	0				
SC-027	SC	LAKE MOULTRIE	FW	1.21	46	0	0					45	0				
SC-034	SC	DUCKS POND CR	FW	121.15	14	2	14	600				10	0				
SC-028	SC	LAKE MOULTRIE	FW	1.22	48	0	0					45	0				
SC-029	SC	LAKE MOULTRIE	FW	1.51	47	0	0					14	0				
SC-030	SC	LAKE MOULTRIE	FW	1.78	49	0	0					46	0				
SC-031	SC	LAKE MOULTRIE	FW	1.48	49	0	0					46	0				
SC-046	SC	LAKE MOULTRIE	FW		31	0	0					31	0				
SC-032	SC	LAKE MOULTRIE	FW	2.44	48	0	0					45	0				
SC-033	SC	TAILRACE CANAL	FW	12.13	53	1	2	520				52	0				
CSTL-062	P	TAILRACE CANAL	FW	14.72	55	1	2	610	D	167	-0.75	51	0	18	0	DL	0
03050201020																	
ST-007	S	WALKER SWAMP	FW	316.64	25	11	44	1026	D	67	-31.2698	2	0	7	0	DL	0
CSTL-113	CS	WADBOO SWAMP	FW	322.81	5	2	40	555				5	0	2	0	DL	0
03050201030																	
CSTL-085	P*	COOPER RVR	FW	53.52	28	3	11	1007	*	76							
MD-217	P	DURHAM CK	FW	35.21	56	2	4	1250	*	152		55	0	18	0	DL	0
03050201050																	
MD-152	P	COOPER RVR	FW	31.37	54	1	2	1600	*	155		53	0	20	0	DL	0
MD-152	P	COOPER RVR	SB	31.37	54	1	2	1600	*	155		53	0	20	0	DL	0
MD-043	P	COOPER RVR	SB	25.06	52	0	0		*	152		50	0	19	0	DL	0
MD-044	P	COOPER RVR	SB	26.93	54	0	0		*	156		47	0	19	0	DL	0
MD-249	P	FILBIN CK	SB	628.67	56	39	70	1264	*	61		54	0	19	0	DL	0
MD-248	P	COOPER RVR	SB	36.05	53	4	8	1425	D	54	-5.5	49	0	19	0	DL	0
MD-045	P	COOPER RVR	SB	26.25	51	1	2	1600	D	151	-1.7596	47	0	19	0	DL	0
MD-243	P	SHIPYARD CK	SB	32.01	53	2	4	1600	D	89	-6.5833	45	0	19	0	DL	0
MD-047	P	TOWN CK, COOPER RVR	SB	38.94	53	2	4	700	*	155		43	0	18	0	DL	0
MD-046	P	COOPER RVR	SB	21.72	52	1	2	900	*	151		42	0	19	0	DL	0
03050201060																	
MD-240	P	FOSTER CK	FW	127.2	56	14	25	1600	*	112		54	0	18	1	DL	6

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	CR	CR	CR	CR	CU	CU	CU	PB	PB	PB	PB	HG	HG	HG	HG
NUMBER	TYPE		CLASS	N	EXC.	MED.	%	N	EXC.	%	N	EXC.	MED.	%	N	EXC.	MED.	%
03050201010																		
SC-043	SC	UNNAMED TRIB	FW															
SC-026	SC	UNNAMED TRIB	FW															
SC-027	SC	LAKE MOULTRIE	FW															
SC-034	SC	DUCKS POND CR	FW															
SC-028	SC	LAKE MOULTRIE	FW															
SC-029	SC	LAKE MOULTRIE	FW															
SC-030	SC	LAKE MOULTRIE	FW															
SC-031	SC	LAKE MOULTRIE	FW															
SC-046	SC	LAKE MOULTRIE	FW															
SC-032	SC	LAKE MOULTRIE	FW															
SC-033	SC	TAILRACE CANAL	FW															
CSTL-062	P	TAILRACE CANAL	FW	18	0	DL	0	18	1	6	18	0	DL	0	17	0	DL	0
03050201020																		
ST-007	S	WALKER SWAMP	FW	7	0	DL	0	7	0	0	7	0	DL	0	7	0	DL	0
CSTL-113	CS	WADBOO SWAMP	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050201030																		
CSTL-085	P*	COOPER RVR	FW															
MD-217	P	DURHAM CK	FW	18	1	DL	6	18	0	0	18	0	DL	0	18	0	DL	0
03050201050																		
MD-152	P	COOPER RVR	FW	20	0	DL	0	20	1	5	20	0	DL	0	20	0	DL	0
MD-152	P	COOPER RVR	SB	20	0	DL	0	20	1	5	20	0	DL	0	20	0	DL	0
MD-043	P	COOPER RVR	SB	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
MD-044	P	COOPER RVR	SB	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
MD-249	P	FILBIN CK	SB	19	0	DL	0	19	1	5	19	0	DL	0	19	0	DL	0
MD-248	P	COOPER RVR	SB	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
MD-045	P	COOPER RVR	SB	19	0	DL	0	19	1	5	19	0	DL	0	18	0	DL	0
MD-243	P	SHIPYARD CK	SB	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
MD-047	P	TOWN CK, COOPER RVR	SB	18	0	DL	0	18	0	0	17	0	DL	0	18	0	DL	0
MD-046	P	COOPER RVR	SB	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
03050201060																		
MD-240	P	FOSTER CK	FW	18	0	DL	0	18	3	17	18	0	DL	0	18	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050201010									
SC-043	SC	UNNAMED TRIB	FW						
SC-026	SC	UNNAMED TRIB	FW						
SC-027	SC	LAKE MOULTRIE	FW						
SC-034	SC	DUCKS POND CR	FW						
SC-028	SC	LAKE MOULTRIE	FW						
SC-029	SC	LAKE MOULTRIE	FW						
SC-030	SC	LAKE MOULTRIE	FW						
SC-031	SC	LAKE MOULTRIE	FW						
SC-046	SC	LAKE MOULTRIE	FW						
SC-032	SC	LAKE MOULTRIE	FW						
SC-033	SC	TAILRACE CANAL	FW						
CSTL-062	P	TAILRACE CANAL	FW	18	0	0	18	0	0
03050201020									
ST-007	S	WALKER SWAMP	FW	7	0	0	7	0	0
CSTL-113	CS	WADBOO SWAMP	FW	2	0	0	2	0	0
03050201030									
CSTL-085	P*	COOPER RVR	FW						
MD-217	P	DURHAM CK	FW	18	0	0	18	0	0
03050201050									
MD-152	P	COOPER RVR	FW	20	0	0	20	1	5
MD-152	P	COOPER RVR	SB	20	0	0	20	1	5
MD-043	P	COOPER RVR	SB	19	0	0	18	1	6
MD-044	P	COOPER RVR	SB	19	0	0	19	0	0
MD-249	P	FILBIN CK	SB	19	0	0	19	0	0
MD-248	P	COOPER RVR	SB	19	0	0	19	0	0
MD-045	P	COOPER RVR	SB	19	0	0	19	0	0
MD-243	P	SHIPYARD CK	SB	19	0	0	19	0	0
MD-047	P	TOWN CK, COOPER RVR	SB	18	0	0	18	0	0
MD-046	P	COOPER RVR	SB	19	0	0	19	1	5
03050201060									
MD-240	P	FOSTER CK	FW	18	0	0	18	0	0

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	DO	DO	DO	MEAN	TRENDS (84-98)						pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS	N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG	N	EXC.	%	EXC.	PH	N	MAG
03050201070																				
MD-114	P	GOOSE CK	FW	57	53	93	1.663	*	159		*	144		56	9	16	5.761	*	158	
ST-033	CS	LAKE, GOOSE CK RESERVOIR	FW	4	0	0								4	1	25	9.01			
MD-113	I*	LAKE, GOOSE CK RESERVOIR	FW	15	7	47	1.5	D	133	-0.175	*	129		14	0	0		D	131	-0.0277
ST-032	P	LAKE, GOOSE CK RESERVOIR	FW	52	8	15	3.875	*	58		*	55		52	3	6	9.213	I	58	0.2216
MD-039	P	GOOSE CK	SB	56	5	9	3.05	*	115		D	111	-0.1	56	3	5	6.423	*	116	
03050201080																				
MD-115	P	WANDO RVR	SFH	59	15	25	4.643	D	177	-0.113	D	166	-0.05	59	1	2	6.4	*	177	
MD-198	P	WANDO RVR	SFH	52	5	10	4.62	D	162	-0.058	*	151		52	0	0		D	159	-0.0166
03050202010																				
CSTL-063	P	WASSAMASSAW SWAMP	FW	56	22	39	3.466	*	165		D	162	-0.08	56	2	4	5.88	*	164	
CSTL-078	CS	CYPRESS SWAMP	FW	6	6	100	3.517							6	0	0				
03050202020																				
CSTL-102	P	ASHLEY RVR	FW	55	16	29	4.362	D	125	-0.04	*	121		55	2	4	5.68	*	123	
CSTL-102	P	ASHLEY RVR	SA	55	16	29	4.362	D	125	-0.04	*	121		55	2	4	5.68	*	123	
03050202030																				
CSTL-043	S	SAWMILL BRANCH	FW	30	12	40	3.458	*	74		D	73	-0.23	30	1	3	5.97	D	74	-0.021
CSTL-013	P	DORCHESTER CK	SA	53	9	17	3.9	*	112		D	107	-0.13	53	9	17	7.616	*	112	
CSTL-099	P	EAGLE CK	SB	57	3	5	3.05	*	122		D	119	-0.114	57	11	19	6.678	*	121	
03050202040																				
MD-049	P	ASHLEY RVR	SA	55	21	38	4.025	*	174		D	171	-0.056	54	5	9	6.516	*	170	
MD-246	P	CHURCH CK	SA*	56	8	14	3.319	*	76		D	67	-0.133	58	0	0		I	79	0.0466
MD-135	S*	ASHLEY RVR	SA*	32	2	6	2.825	*	100		*	76		33	0	0		*	98	
MD-052	P	ASHLEY RVR	SA	58	8	14	4.499	D	180	-0.075	D	157	-0.027	58	0	0		D	176	-0.015
03050202050																				
MD-121	S	LOG BRIDGE CK	SFH	27	22	81	3.903	*	34		*	36		28	4	14	6.262	I	35	-0.0666
MD-202	P	STONO RVR	SFH	56	13	23	4.282	D	179	-0.05	D	168	-0.05	57	0	0		D	180	-0.0142
MD-025	S	ELLIOTT CUT	SFH	33	14	42	4.319	D	93	-0.043	D	78	-0.1	33	0	0		D	93	-0.0166
MD-020	P	WAPPOO CK	SB	54	1	2	3.75	D	173	-0.05	D	157	-0.022	57	0	0		D	171	-0.0125
03050202060																				
MD-069	P	ICWW	SB	52	2	4	3.5	D	167	-0.062	*	155		55	2	4	8.71	D	167	-0.01
MD-069	P	ICWW	SFH	52	5	10	4.19	D	167	-0.062	*	155		55	2	4	8.71	D	167	-0.01
MD-250	CS	AWENDAW CK	SFH	8	2	25	4.25							8	3	38	5.93			
MD-203	P	JEREMY CK	SFH	59	6	10	4.488	*	80		*	80		59	3	5	7.18	I	80	0.0587

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050201070																		
MD-114	P	GOOSE CK	FW	*	80		D	148	-0.0076	*	147		*	153				
ST-033	CS	LAKE, GOOSE CK RESERVOIR	FW															
MD-113	I*	LAKE, GOOSE CK RESERVOIR	FW	*	37		D	121	-0.004	*	122		*	129				
ST-032	P	LAKE, GOOSE CK RESERVOIR	FW	I	50	0.0067	I	50	0.0067	I	49	0.047	I	54	0.5			
MD-039	P	GOOSE CK	SB	*	67		D	109	-0.005	*	66		I	113	0.3			
03050201080																		
MD-115	P	WANDO RVR	SFH	*	78		D	167	-0.00125	D	166	-0.0175	I	163	0.2			
MD-198	P	WANDO RVR	SFH	*	66		D	150	-0.0011	D	145	-0.015	I	150	0.0833			
03050202010																		
CSTL-063	P	WASSAMASSAW SWAMP	FW	*	71		D	157	-0.001	D	156	-0.017	I	164	0.6333			
CSTL-078	CS	CYPRESS SWAMP	FW															
03050202020																		
CSTL-102	P	ASHLEY RVR	FW	*	61		*	113		*	68		*	123				
CSTL-102	P	ASHLEY RVR	SA	*	61		*	113		*	68		*	123				
03050202030																		
CSTL-043	S	SAWMILL BRANCH	FW				D	68	-0.0767				D	74	-1.33			
CSTL-013	P	DORCHESTER CK	SA	D	60	-0.0101	D	102	-0.04225	D	60	-0.0577	D	110	-0.866			
CSTL-099	P	EAGLE CK	SB	*	61		D	107	-0.03775	*	69		D	121	-1.1666			
03050202040																		
MD-049	P	ASHLEY RVR	SA	*	69		D	161	-0.006	D	161	-0.03	I	173	0.5			
MD-246	P	CHURCH CK	SA*	D	66	-0.01	D	66	-0.01	D	66	-0.0775	*	67				
MD-135	S*	ASHLEY RVR	SA*	*	42		*	89					I	79	0.4			
MD-052	P	ASHLEY RVR	SA	*	70		D	158	-0.0016	D	154	-0.0144	I	159	0.26			
03050202050																		
MD-121	S	LOG BRIDGE CK	SFH				*	32					I	36	1.36			
MD-202	P	STONO RVR	SFH	I	71	0.002	D	160	-0.0014	D	156	-0.018	I	169	0.348			
MD-025	S	ELLIOTT CUT	SFH				D	73	-0.0036				*	78				
MD-020	P	WAPPOO CK	SB	*	69		D	156	-0.0014	D	151	-0.0118	*	157				
03050202060																		
MD-069	P	ICWW	SB	*	67		D	152	-0.0025	*	143		*	156				
MD-069	P	ICWW	SFH	*	67		D	152	-0.0025	*	143		*	156				
MD-250	CS	AWENDAW CK	SFH															
MD-203	P	JEREMY CK	SFH	*	68		I	74	0.0033	I	74	0.029	*	79				

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)			NH3	NH3	CD	CD	CD	CD
NUMBER	TYPE		CLASS	MEAN	N	EXC.	%	EXC.	BACT	N	MAG	N	EXC.	N	EXC.	MED.	%
03050201070																	
MD-114	P	GOOSE CK	FW	48.89	55	6	11	1300	D	147	-2	53	0	18	0	DL	0
ST-033	CS	LAKE, GOOSE CK RESERVOIR	FW	23.78	3	0	0					4	0	1	0	DL	0
MD-113	I*	LAKE, GOOSE CK RESERVOIR	FW	22.17	15	2	13	700	*	132		14	0	5	0	DL	0
ST-032	P	LAKE, GOOSE CK RESERVOIR	FW	4.84	49	0	0		*	54		47	0	15	0	DL	0
MD-039	P	GOOSE CK	SB	500.33	56	36	64	1192	*	114		53	0	18	0	DL	0
03050201080																	
MD-115	P	WANDO RVR	SFH	17.26	59	4	7	875	*	159		56	0	18	0	DL	0
MD-198	P	WANDO RVR	SFH	12.13	52	0	0		*	151		43	0	19	0	DL	0
03050202010																	
CSTL-063	P	WASSAMASSAW SWAMP	FW	197.1	56	14	25	1108	I	160	9	55	0	19	0	DL	0
CSTL-078	CS	CYPRESS SWAMP	FW	417.9	6	3	50	927				6	0	2	0	DL	0
03050202020																	
CSTL-102	P	ASHLEY RVR	FW	231.18	54	13	24	1051	*	119		51	0	17	0	DL	0
CSTL-102	P	ASHLEY RVR	SA	231.18	54	13	24	1051	*	119		51	0	17	0	DL	0
03050202030																	
CSTL-043	S	SAWMILL BRANCH	FW	557.08	30	22	73	1159	*	70							
CSTL-013	P	DORCHESTER CK	SA	319.89	52	22	42	1769	D	108	-13.333	47	0	14	0	DL	0
CSTL-099	P	EAGLE CK	SB	461.19	57	25	44	1946	D	120	-18.263	51	0	19	0	DL	0
03050202040																	
MD-049	P	ASHLEY RVR	SA	279.13	55	21	38	1211	I	172	7.5	51	0	16	0	DL	0
MD-246	P	CHURCH CK	SA*	210.88	52	18	35	1072	*	67		52	0	19	0	DL	0
MD-135	S*	ASHLEY RVR	SA*	72.09	29	3	10	633	*	81		1	0				
MD-052	P	ASHLEY RVR	SA	80.97	53	5	9	1260	*	160		48	0	19	0	DL	0
03050202050																	
MD-121	S	LOG BRIDGE CK	SFH	320.32	29	13	45	1415	*	34							
MD-202	P	STONO RVR	SFH	72.06	56	6	11	937	*	171		52	0	19	0	DL	0
MD-025	S	ELLIOTT CUT	SFH	94.37	29	4	14	1425	D	79	-4.6905						
MD-020	P	WAPPOO CK	SB	51.91	53	3	6	633	I	158	1.2307	45	0	19	0	DL	0
03050202060																	
MD-069	P	ICWW	SB	14.63	51	2	4	1250	*	156		38	0	19	0	DL	0
MD-069	P	ICWW	SFH	14.63	51	2	4	1250	*	156		38	0	19	0	DL	0
MD-250	CS	AWENDAW CK	SFH	335.44	8	2	25	1600				8	0	3	0	DL	0
MD-203	P	JEREMY CK	SFH	130.01	59	14	24	1036	*	80		55	0	17	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	CR N	CR EXC.	CR MED.	CR %	CU N	CU EXC.	CU %	PB N	PB EXC.	PB MED.	PB %	HG N	HG EXC.	HG MED.	HG %
03050201070																		
MD-114	P	GOOSE CK	FW	18	0	DL	0	18	1	6	18	0	DL	0	18	0	DL	0
ST-033	CS	LAKE, GOOSE CK RESERVOIR	FW	1	0	DL	0	1	1	100	1	0	DL	0	1	0	DL	0
MD-113	I*	LAKE, GOOSE CK RESERVOIR	FW	5	0	DL	0	5	0	0	5	0	DL	0	5	0	DL	0
ST-032	P	LAKE, GOOSE CK RESERVOIR	FW	15	0	DL	0	15	0	0	15	0	DL	0	15	0	DL	0
MD-039	P	GOOSE CK	SB	18	0	DL	0	18	1	6	18	0	DL	0	18	0	DL	0
03050201080																		
MD-115	P	WANDO RVR	SFH	18	0	DL	0	18	0	0	18	0	DL	0	18	0	DL	0
MD-198	P	WANDO RVR	SFH	19	0	DL	0	19	0	0	19	0	DL	0	18	0	DL	0
03050202010																		
CSTL-063	P	WASSAMASSAW SWAMP	FW	18	0	DL	0	19	0	0	19	0	DL	0	19	0	DL	0
CSTL-078	CS	CYPRESS SWAMP	FW	2	0	DL	0	2	0	0	2	0	DL	0	2	0	DL	0
03050202020																		
CSTL-102	P	ASHLEY RVR	FW	17	0	DL	0	17	0	0	17	0	DL	0	17	0	DL	0
CSTL-102	P	ASHLEY RVR	SA	17	0	DL	0	17	0	0	17	0	DL	0	17	0	DL	0
03050202030																		
CSTL-043	S	SAWMILL BRANCH	FW															
CSTL-013	P	DORCHESTER CK	SA	14	0	DL	0	14	0	0	14	0	DL	0	14	0	DL	0
CSTL-099	P	EAGLE CK	SB	19	0	DL	0	19	0	0	19	0	DL	0	19	0	DL	0
03050202040																		
MD-049	P	ASHLEY RVR	SA	16	0	DL	0	16	2	13	16	0	DL	0	16	0	DL	0
MD-246	P	CHURCH CK	SA*	18	0	DL	0	18	0	0	19	0	DL	0	18	0	DL	0
MD-135	S*	ASHLEY RVR	SA*															
MD-052	P	ASHLEY RVR	SA	18	0	DL	0	18	0	0	19	0	DL	0	18	0	DL	0
03050202050																		
MD-121	S	LOG BRIDGE CK	SFH															
MD-202	P	STONO RVR	SFH	19	0	DL	0	19	0	0	19	0	DL	0	19	0	DL	0
MD-025	S	ELLIOTT CUT	SFH															
MD-020	P	WAPPOO CK	SB	18	0	DL	0	18	1	6	19	0	DL	0	18	0	DL	0
03050202060																		
MD-069	P	ICWW	SB	19	0	DL	0	19	0	0	18	0	DL	0	19	0	DL	0
MD-069	P	ICWW	SFH	19	0	DL	0	19	0	0	18	0	DL	0	19	0	DL	0
MD-250	CS	AWENDAW CK	SFH	3	0	DL	0	3	0	0	3	0	DL	0	3	0	DL	0
MD-203	P	JEREMY CK	SFH	17	0	DL	0	17	0	0	17	0	DL	0	17	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050201070									
MD-114	P	GOOSE CK	FW	18	0	0	18	0	0
ST-033	CS	LAKE, GOOSE CK RESERVOIR	FW	1	0	0	1	0	0
MD-113	I*	LAKE, GOOSE CK RESERVOIR	FW	5	0	0	5	0	0
ST-032	P	LAKE, GOOSE CK RESERVOIR	FW	15	0	0	15	1	7
MD-039	P	GOOSE CK	SB	18	0	0	18	0	0
03050201080									
MD-115	P	WANDO RVR	SFH	18	0	0	18	1	6
MD-198	P	WANDO RVR	SFH	19	0	0	19	0	0
03050202010									
CSTL-063	P	WASSAMASSAW SWAMP	FW	19	0	0	19	0	0
CSTL-078	CS	CYPRESS SWAMP	FW	2	0	0	2	0	0
03050202020									
CSTL-102	P	ASHLEY RVR	FW	17	0	0	17	0	0
CSTL-102	P	ASHLEY RVR	SA	17	0	0	17	0	0
03050202030									
CSTL-043	S	SAWMILL BRANCH	FW						
CSTL-013	P	DORCHESTER CK	SA	14	0	0	14	0	0
CSTL-099	P	EAGLE CK	SB	19	0	0	19	0	0
03050202040									
MD-049	P	ASHLEY RVR	SA	16	0	0	16	0	0
MD-246	P	CHURCH CK	SA*	18	0	0	19	0	0
MD-135	S*	ASHLEY RVR	SA*						
MD-052	P	ASHLEY RVR	SA	18	0	0	19	0	0
03050202050									
MD-121	S	LOG BRIDGE CK	SFH						
MD-202	P	STONO RVR	SFH	19	0	0	19	0	0
MD-025	S	ELLIOTT CUT	SFH						
MD-020	P	WAPPOO CK	SB	18	0	0	18	1	5
03050202060									
MD-069	P	ICWW	SB	19	0	0	19	0	0
MD-069	P	ICWW	SFH	19	0	0	19	0	0
MD-250	CS	AWENDAW CK	SFH	3	0	0	3	0	0
MD-203	P	JEREMY CK	SFH	17	0	0	17	1	6

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST		DO	DO	DO	MEAN	TRENDS (84-98)							pH	pH	pH	MEAN	TRENDS (84-98)		
NUMBER	TYPE		CLASS		N	EXC.	%	EXC.	DO	N	MAG	BOD	N	MAG		N	EXC.	%	EXC.	PH	N	MAG
03050202070																						
MD-071	P	SHEM CK	SB		52	7	13	3.364	D	175	-0.054	*	150			54	0	0		*	175	
MD-247	P	CHARLESTON HARBOR	SB		54	0	0		*	83		*	65			56	3	5	8.54	*	86	
MD-034	P	ASHLEY RVR	SA		52	1	2	4.2	*	176		*	156			54	0	0		D	172	-0.0129
MD-165	P	CHARLESTON HARBOR	SB		59	0	0		*	173		*	156			59	1	2	8.62	*	172	
MD-048	P	CHARLESTON HARBOR	SB		56	0	0		*	177		*	152			58	0	0		*	175	
MD-026	P	STONO RVR	SFH		57	10	18	4.365	D	182	-0.085	D	169	-0.07		57	0	0		D	180	-0.0137
MD-206	S	STONO RVR	SFH		32	9	28	4.3	*	96		D	73	-0.033		34	0	0		*	96	
MD-207	S	KIAWAH RVR	SFH		32	0	0		*	94		D	72	-0.028		35	0	0		*	95	
MD-208	P*	STONO RVR	SFH		32	0	0		*	103		*	76			34	2	6	6.2	*	102	

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST	TRENDS (92-98)			TRENDS (84-98)											
NUMBER	TYPE		CLASS	TP	N	MAG	TP	N	MAG	TN	N	MAG	TURB	N	MAG	TSS	N	MAG
03050202070																		
MD-071	P	SHEM CK	SB	*	79		D	161	-0.0028	D	158	-0.0166	*	152				
MD-247	P	CHARLESTON HARBOR	SB	*	72		*	72		D	70	-0.036	*	65				
MD-034	P	ASHLEY RVR	SA	*	78		D	163	-0.001	D	159	-0.0175	*	156				
MD-165	P	CHARLESTON HARBOR	SB	*	69		D	154	-0.0011	D	149	-0.01	I	156	0.1472			
MD-048	P	CHARLESTON HARBOR	SB	*	72		D	156	-0.002	*	147		*	152		I	122	0.5549
MD-026	P	STONO RVR	SFH	*	68		D	155	-0.0025	D	152	-0.0166	I	168	0.25			
MD-206	S	STONO RVR	SFH	*	30		D	73	-0.00125				I	75	0.2944			
MD-207	S	KIAWAH RVR	SFH	*	32		D	76	-0.0025				I	75	0.2742			
MD-208	P*	STONO RVR	SFH	*	37		D	79	-0.00166				I	79	0.2			

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST		GEO	BACT	BACT	BACT	MEAN	TRENDS (84-98)				NH3	NH3		CD	CD	CD	CD
NUMBER	TYPE		CLASS		MEAN	N	EXC.	%	EXC.	BACT	N	MAG		N	EXC.		N	EXC.	MED.	%
03050202070																				
MD-071	P	SHEM CK	SB		132.45	51	14	27	1264	I	152	3.56818		38	0		18	0	DL	0
MD-247	P	CHARLESTON HARBOR	SB		11.67	50	1	2	1600	*	64			40	0		19	0	DL	0
MD-034	P	ASHLEY RVR	SA		43.04	51	3	6	1367	*	155			42	0		19	0	DL	0
MD-165	P	CHARLESTON HARBOR	SB		31.96	53	4	8	600	I	155	0.66667		45	0		19	0	DL	0
MD-048	P	CHARLESTON HARBOR	SB		16.85	51	1	2	500	*	151			39	0		17	0	DL	0
MD-026	P	STONO RVR	SFH		37.7	56	3	5	867	*	171			53	0		16	0	DL	0
MD-206	S	STONO RVR	SFH		6.37	28	0	0		*	80									
MD-207	S	KIAWAH RVR	SFH		3.24	31	0	0		*	80			1	0		2	0	DL	0
MD-208	P*	STONO RVR	SFH		2.65	31	0	0		*	84			1	0		2	0	DL	0

Water Quality Summary - Santee River Basin

STATION		WATERBODY NAME	FIRST		CR	CR	CR	CR		CU	CU	CU		PB	PB	PB	PB		HG	HG	HG	HG
NUMBER	TYPE		CLASS		N	EXC.	MED.	%		N	EXC.	%		N	EXC.	MED.	%		N	EXC.	MED.	%
03050202070																						
MD-071	P	SHEM CK	SB		18	0	DL	0		18	0	0		17	0	DL	0		17	0	DL	0
MD-247	P	CHARLESTON HARBOR	SB		19	0	DL	0		19	0	0		18	0	DL	0		18	0	DL	0
MD-034	P	ASHLEY RVR	SA		17	0	DL	0		17	0	0		17	0	DL	0		16	0	DL	0
MD-165	P	CHARLESTON HARBOR	SB		18	0	DL	0		18	0	0		19	0	DL	0		18	0	DL	0
MD-048	P	CHARLESTON HARBOR	SB		17	0	DL	0		17	0	0		17	0	DL	0		16	0	DL	0
MD-026	P	STONO RVR	SFH		16	0	DL	0		16	1	6		16	0	DL	0		16	0	DL	0
MD-206	S	STONO RVR	SFH																			
MD-207	S	KIAWAH RVR	SFH		2	0	DL	0		2	0	0		2	0	DL	0		2	0	DL	0
MD-208	P*	STONO RVR	SFH		2	0	DL	0		2	0	0		2	0	DL	0		2	0	DL	0

Water Quality Summary - Santee River Basin

STATION NUMBER	TYPE	WATERBODY NAME	FIRST CLASS	NI N	NI EXC.	NI %	ZN N	ZN EXC.	ZN %
03050202070									
MD-071	P	SHEM CK	SB	18	0	0	18	0	0
MD-247	P	CHARLESTON HARBOR	SB	19	1	5	19	1	5
MD-034	P	ASHLEY RVR	SA	17	0	0	17	0	0
MD-165	P	CHARLESTON HARBOR	SB	18	0	0	19	0	0
MD-048	P	CHARLESTON HARBOR	SB	17	0	0	17	0	0
MD-026	P	STONO RVR	SFH	16	0	0	16	0	0
MD-206	S	STONO RVR	SFH						
MD-207	S	KIAWAH RVR	SFH	2	0	0	2	0	0
MD-208	P*	STONO RVR	SFH	2	0	0	2	0	0

APPENDIX C.

Shellfish Monitoring Stations

Shellfish Monitoring Stations

WATERSHED	STATION	DESCRIPTION
03050112-060	06A-01	South Santee River at Alligator Creek
	06A-02	South Santee Inlet
	06A-03	North Santee River at Beach Creek
	06A-04	North Santee Inlet
	06A-04A	North Santee Bay - E. of Cane Island
	06A-04B	North Santee River - SW of Cane Island
	06A-05	North Santee River and Mosquito Creek
	06A-11	Atlantic Intracoastal Waterway at Minum Creek
	06B-13	Alligator Creek nearest South Santee River between Markers 24 and 25
03050201-050	09B-13	Confluence of Wando River and Cooper River
	10B-06	Center of channel off Charleston Yacht Club
03050201-080	09B-01	Wando River at Nowell Creek
	09B-02	Wando River at Horlbeck Creek
	09B-03	Wando River at S.C. Hwy. 41 bridge
	09B-04	Wando River at Deep Creek
	09B-05	Wando River opposite Big Paradise Island
	09B-06	Wando River at Paradise Boat Landing
	09B-07	Boone Hall Creek opposite County Recreation Area
	09B-08	Wando River at Marker #29
	09B-09	Deep Creek - 1 mi from confluence with Wando River
	09B-10	Wando River at Alston Creek confluence
	09B-11	Wando River at Guerin Creek
	09B-12	Guerin Creek at Old House Creek
	09B-14	North edge of SC Port Authority/Wando Terminal
	09B-15	New bridge - Route 1-526
	09B-16	Confluence of Martin Creek and Nowell Creek
	09B-17	Wando River midway between Stations 3 and 11 (at old dry dock)
	09B-18	Mouth of small unnamed creek between day Markers 14 & 16 on east side of Wando River
03050202-050	10B-08	Center of Ashley River - Off CG Base
	11-01	Elliot Cut at Stono River
	11-02	Stono Bridge at S.C. Hwy. 700
	11-11	Stono River (AIWW) at Marker #21A

WATERSHED	STATION	DESCRIPTION
03050202-050	11-12	Stono River (AIWW) at Marker #27
	11-16	Stono River (AIWW) at Marker #51
	11-17	Stono River (Log Bridge Creek) at Marker #54
	11-18	Confluence of Rantowles Creek and Stono River
	11-20	Ashley River at Wappoo Cut
	11-27	Stono Inlet at mouth of Penny Creek near Marker #25
03050202-060	06B-06	Alligator Creek and Ocean Inlet
	06B-07	Alligator Creek at Marker #26
	06B-08	Casino Creek at Marker #29
	06B-09	Dupree Creek - 500 ft N of new dock (south of Marker #30)
	06B-10	AIWW at Marker #32
	06B-12	Alligator Creek State Shellfish Ground
	06B-14	Horsehead Creek at confluence with Cape Romain Harbor
	06B-15	Casino Creek at Cape Romain Harbor
	06B-16	Casino Creek midway between Sta. 19 & 24 (at small unnamed creek on right, southbound)
	06B-17	Congaree Boat Creek at Tower Creek
	06B-18	Confluence of Dupree Creek and Clubhouse Creek
	06B-19	Confluence of Casino Creek and Shrine Creek
	06B-20	1,000 yds up Dupree Creek from Clubhouse Creek
	06B-21	Confluence of Alligator Creek and Ramhorn Creek
	06B-22	Confluence of Ramhorn Creek and Mill Creek
	06B-23	Confluence of Shrine Creek and Congaree Boat Creek
	06B-24	Confluence of Casino Creek and Congaree Boat Creek
	06B-25	Confluence of Horsehead Creek and unnamed creek at lower end of Horsehead Island
	06B-26	Confluence of Shrine Creek and unnamed creek north of Muddy Bay
	07-01	Venning Creek - adjacent to Marker #67
	07-01A	Venning Creek at Bulls Bay
	07-02	Graham Creek at Marker #64
	07-02A	Graham Creek and Bulls Bay
	07-03	Awendaw Creek at Marker #57
	07-04	Harbor River at Marker #48
	07-04A	Harbor River at Bulls Bay
	07-05	Tibwin Creek at Marker #42
	07-06	Five Fathom Creek at Marker #20

WATERSHED	STATION	DESCRIPTION
03050202-060	07-06A	Five Fathom Creek at Bull River
	07-07	Jeremy Creek opposite Fire Tower
	07-08	Clubhouse Creek-1/4 mi N of Five Fathom Creek
	07-08A	Oyster Bay at Muddy Bay
	07-09	Confluence of Doe Hall Creek with AIWW - north of Marker #46
	07-11	Five Fathom Creek at Marker #11
	07-12	Confluence of Raccoon Creek and Romain River
	07-13	Romain River at confluence of S Creek
	07-14	Doehall Creek - third bend
	07-15	Sandy Point Creek - forth bend
	07-16	Confluence of Romain River and Santee Path Creek
	07-17	Second small creek north of Marker #26 in Five Fathom Creek
	07-18	Marker #65 in AIWW
	08-01	Morgan Creek at northernmost confluence with AIWW - adjacent to Marker #115
	08-02	Hamlin Sound
	08-03	Dewees Inlet at AIWW - north of Marker #110
	08-04	Bull Yard Sound - Marker #104
	08-05	Whiteside Creek - Marker #96
	08-06	Mark Bay - Marker #90
	08-07	Prices Inlet
	08-08	AIWW - Marker #82
	08-09	Moore s Landing Dock at Marker #74
	08-10	Marker #116 north of Isle of Palms STP outfall in AIWW
	08-11	Isle of Palms STP outfall at 41st Street
	08-12	Morgan Creek at 41st Street Marina
	08-13	Sewee Bay POG - Sewee Bay at Hickory Bay
	08-14	Dewees Island -1/4 mi up Horsebend Creek
	08-15	Dewees Island at Mouth of Watermelon Creek
	08-16	Confluence of Seven Reaches and Gray Bay
	08-17	S.W. Copahee Sound at Porcher Bluff Creek
	08-18	0.5 mile up Cedar Creek from Dewees Inlet
	08-19	Confluence of Toomer Creek at Copahee Sound
	08-20	Upper reaches of Whiteside Creek
	08-21	Upper reaches of Clawson Creek

WATERSHED	STATION	DESCRIPTION
03050202-060	08-22	Confluence of Capers Creek and Santee Pass
	08-23	Confluence of Bull Creek and Back Creek (1992-98)
	09A-01	Hamlin Creek at its confluence with AIWW
	09A-02	Upper end of Hamlin Creek at POG
	09A-03	Upper end of Swinton Creek
	09A-05	Shortcut - Swinton Creek
	09A-06	Inlet Creek and Gentide Creek
	09A-07	Inlet Creek at its confluence with AIWW
	09A-08	Breech Inlet
	09A-09	Ben Sawyer Bridge
	09A-11	End of 10th Street at Hamlin Creek
	09A-12	Swinton Creek at its confluence with Hamlin Creek
	09A-14	Swinton Creek at its confluence with AIWW
	09A-15	AIWW between Inlet and Swinton Creeks
	09A-17	Conch Creek State Shellfish Ground - Mt. Pleasant side
	09A-17A	Conch Creek State Shellfish Ground - Sullivan s Island side
	09A-18	AIWW adjacent to Wild Dunes Golf Course storm drainage outfall
	09A-19	AIWW at 25th Street- Isle of Palms
	09A-20	Conch Creek at Lofton Creek
	09A-21	Inlet Creek 100 yds past first bend
	09A-22	AIWW - Marker #118
	09A-23	Upper reaches of Conch Creek
	09A-24	Upper reaches of Inlet Creek
	09A-25	Upper reaches of Swinton Creek
	09A-26	Hamlin Creek half way between Stations 1 and 2
	09A-27	Inlet Creek west of AIWW at first bend
	09A-28	Swinton Creek west of AIWW at second bend
	09A-29	Lower Hamlin Creek at site of new bridge (Isle of Palms Connector)
	09A-30	Upper Inlet Creek at Jennie Creek
	09A-31	Bay at end of upper Inlet Creek
	09A-32	First creek on right downstream from Station 6
	09A-33	First large creek up Inlet Creek from Station 8
	09A-34	AIWW at confluence with Sullivans Inland Narrows (across from ECOMC dock)
	09A-35	300 yds upstream from Station 6

WATERSHED	STATION	DESCRIPTION
03050202-060	09A-36	Conch Creek at its confluence with AIWW
03050202-070	09A-10	Marker #126 - AIWW at old Pitt Street Bridge
	10A-02	Folly Creek Bridge
	10A-03	Bowen Island Dock in Folly Creek
	10A-04	Backman Creek at Folly Creek
	10A-05	Kings Flat and Folly Creek
	10A-06	Opposite Little Island in Folly Creek
	10A-07	South Boundary of Prohibited Area at Folly Marina
	10A-08	Folly River Bridge
	10A-09	Last dock north in Folly River
	10A-11	Lighthouse Creek and Folly Creek at Rat Island Creek
	10A-13	Confluence of first large unnamed creek on right, after Gal Hole and Lighthouse Creek
	10A-15	Secessionville Creek at private docks
	10A-15A	Folly Creek at confluence with Secessionville Creek
	10A-16	Clark Sound at Ocean View Flats
	10A-16A	Fludds Creek at Clark Sound
	10A-18	Mouth of Schooner Creek
	10A-18A	Charleston Harbor at Schooner Creek
	10A-19	Just inside Clark Sound from Schooner Creek
	10A-20	Backman s commercial dock in Backman Creek
	10A-22	Folly River State Shellfish Ground opposite Folly Island
	10A-23	Lighthouse Creek State Shellfish Ground at mouth of First Sister Creek
	10A-24	Cole Creek State Shellfish Ground
	10A-25	Folly Marina
	10A-26	Just seaward of confluence of Lighthouse Creek and Folly River in Lighthouse Creek
	10A-27	Midway Stations 18 and 18A
	10A-28	Mouth of small creek leading to back of Block Island
	10A-29	Outfall of Morris Island discharge
	10A-30	Second bend in Rathall Creek
	10A-31	Upper reaches of Rat Island Creek NW of Station 11
	10A-32	Block Island Creek - 100 yds south of split from spoil area
	10B-01	Mouth of Charleston Harbor at Buoy #25
	10B-02	200 yds east of mouth of Ft. Johnson boat basin
	10B-02A	Off the end of James Island Yacht Club dock

WATERSHED	STATION	DESCRIPTION
03050202-070	10B-03	Mouth of James Island Creek
	10B-04	Ashley River at Buoy #2 - red nun buoy
	10B-05	Off the tip of the Battery at White Danger Marker
	10B-07	Off old pier pilings at ruins of Castle Pinckney
	10B-09	Mouth of Shem Creek - (red) Marker #16
	310B-11	AIWW at tip of Sullivan s Island Marker #127 (green)
	10B-12	Mt. Pleasant WWTP Outfall
	11-03	Docks between Markers #10 & 11 in Stono River
	11-05	Mouth of Abbapoola Creek
	11-06	Abbapoola Creek at first large bend
	11-07	Green Creek at Stono River
	11-08	Mouth of Kiawah River
	11-10	Kiawah River at Kiawah Island Boat Landing
	11-15	Stono River (AIWW) at Marker #63
	11-19	Middle of Stono Inlet
	11-21	South Kiawah River on the flats
	11-22	Kiawah River POG at Mingo Point
	11-23	Captain Sams Creek and Kiawah River
	11-24	Captain Sams Creek at south tip of Long Island
	11-28	Mullett Hall Creek 150 yds from mouth at fork
	11-29	Kiawah River between Bryans Creek & Mullett Hall Creek
	11-30	Kiawah River at mouth of Bryans Creek
	11-31	Bass Creek at confluence with Kiawah River
	11-32	Bass Creek at confluence with Cinder Creek
	11-33	Sol Legare Boat Landing

APPENDIX D.

Watershed Maps

Waterbody Index

Facility Index